

COCHECO RIVER NOMINATION

**Submitted to the
Department of Environmental Services**

For designation to the

**New Hampshire
Rivers Management and Protection Program**

By the

**Cocheco River Watershed Coalition
with Strafford Regional Planning Commission**

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New Hampshire Rivers Management and Protection Program

River Nomination Form

Instructions: Before beginning any work on a river nomination, Sponsors should contact the State Rivers Coordinator at the NH Department of Environmental Services (NHDES). The Rivers Coordinator can provide initial guidance by identifying local and regional contacts and other sources of information and can give advice throughout the preparation of a river nomination. Refer to the publication, "A Guide to River Nominations," for a step-by-step explanation of the nomination process and a directory of federal, state, regional, and private sources of information and technical assistance. The River Coordinator's address and telephone number are: NHDES Rivers Coordinator, P.O. Box 95, 29 Hazen Drive, Concord, NH 03302-0095, (603) 271-8801.

SECTION I. NOMINATION INFORMATION

1. Name of River: Cocheco River

2. River/River Segment Location (and start/end points) and Length (miles):

From Cocheco River headwaters south of March's Pond in New Durham to the tidal limit at Cocheco Falls Dam in Dover. Total River Miles = 34.61

3. (a) Sponsoring Organization or Individual: Cocheco River Watershed Coalition

(b) Contact Person: Lorie Chase

(c) Address: 268 County Farm Road, Dover, NH 03820

(d) Daytime Telephone Number: (603) 742-4445 FAX: (603) 743-3431

(e) Email: lorie.chase@unh.edu

SECTION II. SUMMARY: RESOURCES OF STATEWIDE OR LOCAL SIGNIFICANCE

In order to be eligible for designation to the NH Rivers Management and Protection Program, a river must contain or represent either a significant statewide or local example of a natural, managed, cultural, or recreational resource.

1. By checking the appropriate boxes below, indicate the resource values that you believe are present in the nominated river and its corridor and whether you believe these values are present at a level of significance that is statewide or local. If the value is not present, leave the box blank.

Natural Resources	Value/Present Local Significance	Value Present/ Statewide Significance
Geologic or Hydrologic Resources	X	X
Wildlife Resources	X	X
Vegetation/Natural Communities	X	X
Fish Resources	X	X
Rare Species or Habitat	X	X
Water Quality	X	X
Open Space	X	X
Natural Flow Characteristics	X	X

Managed Resources

Impoundments	X	
Water Withdrawals/Discharges	X	X
Hydroelectric Resources	X	

Cultural Resources

Historical/Archaeological Resources	X	X
Community River Resources	X	X

Recreational Resources	Value/Present Local Significance	Value Present/ Statewide Significance
Fishery Resources	X	X
Boating Resources	X	X
Other Recreational Resources	X	X
Public Access	X	X

Other Resources

Scenic Resources	X	X
Land Use	X	X
Land Use Controls	X	X
Water Quantity	X	X
Riparian/Flowage Rights	X	X
Scientific Resources	X	X

2. Briefly describe the most important resource values which are present in the nominated river and why you believe these values are significant from either a statewide or local perspective.

Several trends are driving the Cocheco River nomination for designation to the New Hampshire Rivers Management and Protection Program (RMPP).

1. The Cocheco River watershed is in a region undergoing rapid growth both in population and the developed landscape. Changes in the hydrology, vegetative cover, and ecology of the watershed have the potential to alter the existing environmental status of the river. Recent regional and state studies show that water quality can be impaired by urbanization, and water quality may also affect the economic well being of the regional and the state economy (refer below to the Water Quality section, *Effects of Urbanization on Stream Quality at Selected Sites in the Seacoast Region in New Hampshire, 2001—03* and *The Economic Impact of Potential Decline in New Hampshire Water Quality: The Link Between Visitor Perceptions, Usage and Spending (May 2007)*).
2. A growing awareness has emerged that human health requires a healthy environment and in order to achieve this for our future: healthy ecosystems must be restored, maintained and protected; water quality must be protected for natural systems to thrive and to ensure sustainability of drinking water sources; fish and wildlife habitat of ecological significance must be protected; and recreational opportunities and scenic beauty must be sustained for the future.
3. Generations that had become increasingly removed from their historical and natural resources is beginning to focus again on the river as part of their individual and community heritage. The region – particularly the communities of Farmington, Rochester and Dover - value the history of the river and its contributions to the watershed communities. These communities are taking steps to reestablish connections with the river by constructing river walks and trails, and dedicating parks to bring people back to the river.

For these reasons, the Cocheco River serves as a resource of statewide importance, and stands out as a jewel in the rapidly changing landscape of New Hampshire's coastal watershed.

Watershed Community Support

The communities of the Cocheco River Watershed express strong support of the river's ecological functions and services in their Master Plans as well as in ordinances and regulations that require river setbacks and buffers, limited uses and development disturbance near the river, and water quality standards. In fact, several communities require stricter setback and buffer standards for the river than required by the NH Comprehensive Shoreland Protection Act. These local level protections are vitally important to the future ecological health and sustainability of the river's ecosystem.

In 2008, the Town of New Durham strongly supported protection of the Cocheco River and its watershed by adopting a Conservation Focus Area ordinance and a Steep Slope Protection District ordinance. The purpose of the Conservation Focus Area ordinance is to conserve lands of exceptional significance containing the critical ecological, biological, and water resources of New Hampshire's coastal watershed including diverse wildlife habitat, abundant wetlands, high water quality, productive forests, and outstanding recreational opportunities. The Steep Slope Protection District ordinance implements standards for development of steeply sloping lands in order to limit soil loss, erosion, excessive storm water runoff, and the degradation of surface waters, and to maintain the natural topography and drainage patterns of land.

The Town of Farmington has recognized the Cocheco River as an important natural and community resource in its Watershed Protection Overlay District (for the entire town) and Waterfront Protection Overlay District (requires 100-foot setback from the river).

The City of Rochester is working to complete their first Natural Resource Chapter for their Master Plan, which speaks of the natural and community resource values of the Cocheco River.

Wildlife Habitat and Ecological Significance

The Nature Conservancy, the New Hampshire Natural Heritage Bureau and New Hampshire Audubon have recently completed an Ecological Inventory of the Cocheco River and Follet's Brook Watersheds in the Dover/Durham area. During the project, scientists documented six rare plant species, three exemplary natural communities, and forty-nine wildlife species that are considered a priority for conservation and management, including American black duck, woodcock, Canada warbler and wood thrush.

The Land Conservation Plan for New Hampshire's Coastal Watersheds (2007) by The Nature Conservancy and its state, local and non-profit partners, recognizes four Core Focus Areas and their Supporting Landscapes located wholly or partially within the Cocheco River corridor (and several others within the watershed). These areas contain lands of exceptional significance for the protection of living resources and water quality. The Core Focus Areas and Supporting Landscapes include: Cocheco Headwaters (New Durham, Middleton), Blue Hills (Farmington), Rochester Heath Bog (Rochester) and Rochester Neck (Rochester). Refer to Figure 14 for a map of these Core Focus Areas and Supporting Landscape.

New Hampshire Wildlife Action Plan. The New Hampshire Fish and Game Department collaborated with partners in the conservation community to create the state's first Wildlife Action Plan (U.S. Fish & Wildlife Service with partner organizations, 2006, available at http://www.wildlife.state.nh.us/Wildlife/wildlife_plan.htm). The plan, which was mandated and funded by the federal government through the State Wildlife Grants program, provides New Hampshire decision-makers with important tools for restoring and maintaining critical habitats and populations of the state's species of conservation and management concern. It is a pro-active effort to define and implement a strategy that will help keep species off of rare species lists, in the process saving taxpayers millions of dollars. The New Hampshire plan is a comprehensive wildlife conservation strategy that examines the health of wildlife. The plan prescribes specific actions to conserve wildlife and vital habitat before they become more rare and more costly to protect. The NH Wildlife Action plan reports that the Cocheco River corridor and watershed contain several Core Focus Areas and highest quality habitat in NH and in a biological region (as defined in the plan). The Cocheco River corridor supports habitat for several endangered species of plants, animals and birds. Refer to Figure 15 for a map of the Core Focus Areas and Highest Quality Habitat Areas.

Recreation and Scenic Beauty

Access to a beautiful place for recreation also brings increased public awareness and appreciation of river resources. Public perception of the river has not always been positive, based on historic pollution of the river. Development of positive perceptions and attitudes is facilitated by recreational experiences and can result in development of stewardship of the resources.

The Cocheco fishery is a statewide resource, which attracts anglers from across NH and is promoted on angler websites nationally. The Cocheco River has been a favorite paddling destination for canoes and kayakers. Growth in passive recreation such as wildlife watching, water recreation (canoe, kayak), walking trails, snow-shoeing, and cross-country skiing are reflected in the use of the river corridor. Regional support of the river is evidenced by the over 100 paddlers that participate in the Cocheco River Sweep from Farmington to Rochester each year.

Wildlife Journal, a co-production of the NH Public Television and NH Fish & Game Department, produced the film "Wild Places: Cocheco River". From its headwaters in New Durham to where it joins the Salmon Falls River in Dover, the film showcases the 30 miles of scenic beauty, habitat for fish, waterfowl and wildlife, and prized conditions for paddlers.

Areas of scenic beauty can be found from the headwaters area in New Durham to the head of tidal waters at Cocheco Falls Dam in Dover: In the upper watershed the river flows from the hills as a small stream gathering waters from other small stream tributaries as it descends to the Cocheco River valley in Farmington. From Farmington to Rochester it flows as a small river in a forested river corridor. In Rochester the river emerges from the "backyards" of residential neighborhoods into the urban center of

Cocheco River Nomination Form

NH Rivers Management and Protection Program

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downtown Rochester. There it is a scenic focus in the renewal of the downtown area. It shortly disappears into a quiet corridor through residential backyards with forested buffers. Gathering waters from mid-watershed tributaries it flows into downtown Dover where it is impounded by the dam at Cocheco Falls and the industrial mills.

History

Watershed communities are focusing on their heritage as means of defining their futures. The river is a significant source of connections to the past. Within the Cocheco River corridor Dover and Rochester are enhancing their downtown areas by creating river walks and celebrating their histories as part of the "Main Street" programs. New Durham, Farmington, Rochester and Dover all have active historical societies that maintain and interpret collections of historical documents and artifacts. Historical sites are identified and cared for by concerned citizens. Descendants of immigrants who came to work in the mills are rediscovering their cultural heritage.

From the earliest settlement in 1623 through the 19th century, water powered mills on the Cocheco and its tributaries served farmers and woodsmen in the region. Most of the lakes and ponds in the watershed were millponds in those earliest communities. In the nineteenth century availability of waterpower brought the development of industrial manufacturing companies in Rochester, Dover, and Farmington in the river corridor. The companies purchased and controlled many of the early mill sites to control water supply for the huge mills. The Cocheco mills produced textiles of worldwide significance. Ten thousand sample cards are archived at the American Museum of Textile History in Lowell, Massachusetts. After the decline of the mills in mid-twentieth century, cleanup of point source pollution and adaptive reuse of the mills attracted attention to the river as a community resource.

Water Quality

Water Quality has always been a priority issue for the Cocheco River Watershed Coalition (CRWC) since it began in 1998 as an organized citizen group. Other agencies and groups also participate in study and monitoring of water quality in the watershed include: Isinglass River Local Advisory Committee, University of New Hampshire, Lakes Lay Monitoring Program, Milton 3 Ponds Association, NHDES Volunteer Monitoring Program (VRAP) and Volunteer Biological Assessment program (VBAP). CRWC monitors were the first group to participate in the NHDES Volunteer River Assessment Program. Volunteers began to field test baseline parameters - dissolved oxygen, pH, turbidity, specific conductance and water temperature - at 10 baseline sites on the main stem in 1999. Since then the program has expanded and volunteers sample bacteria, nutrients, metals and chlorides at many sites throughout the watershed. Volunteers also participate in the Volunteer Biological Assessment Program. Reports, including data are available on the NH DES website.

Water Quality of the Cocheco River has improved since the 1970's due to strengthened regulation by the Clean Water Act, upgrades to sewage treatment plants discharging to the river, and closing of open landfills and dumps near the river. Although the region has experienced the effects of regional growth and urbanization, many local initiatives have developed with the support of regional and state agencies (such as NHDES, NH Coastal Program, NHEP, UNH Cooperative Extension, Strafford Regional Planning Commission) to manage and reduce overall nonpoint sources of pollution through better management and increased awareness including: adoption of stormwater management and buffer ordinances, education about pet waste and fertilizer use, storm drain stenciling, annual river cleanup days, land conservation and open space planning, local and regional workshops (topics include buffers, low impact development) and dissemination of educational materials to the public.

Three recent reports offer compelling reasons to improve and protect water quality.

1. *The Economic Impact of Potential Decline in New Hampshire Water Quality: The Link Between Visitor Perceptions, Usage and Spending*; Prepared for The NH Lakes, Rivers, Streams and Ponds Partnership by Anne Nordstrom, Ph.D.

As stated in a pamphlet reporting the findings, the primary purpose of this study was to answer the question: How would the state economy be affected if residents and visitors who fish, boat and swim perceive any negative changes to the water quality in the areas where they recreate? In the Seacoast

region, perceived water quality decline within the next year could mean a loss of \$6.2 million in sales, \$2.1 million in lost income and 101 lost jobs if clarity and purity, water level and flow, views and scenery, and crowding conditions worsened.

2. *Effects of Urbanization on Stream Quality at Selected Sites in the Seacoast Region in New Hampshire, 2001—03*, USGS Scientific Investigations Report 2005-5103; prepared in cooperation with the New Hampshire Department of Environmental Services.

The purpose of this study was to obtain local data to make decisions related to state planning in a region experiencing growth and development. One objective was to assess how water quality of small streams varies as a result of land use. The other objective was to relate water quality to forest and urban watershed characteristics. One of the sites selected was Berry Brook in Dover, a small tributary within the Cocheco River corridor. Researchers found that: 1) most chemical constituent concentrations increased with increasing levels of impervious surfaces and urban land near the stream.; 2) Aquatic insect communities were affected at sites with higher levels of impervious surfaces and urban land near the stream; 3) Stream buffers appear to play a key role in maintaining the water quality of streams; and 4) they generated local data for potential use in decision-making related to land use planning and water resources.

3. *Methods for and Estimates of 2003 and Projected Water Use in the Seacoast Region, Southeastern New Hampshire*, Scientific Investigations Report 2007-5157, U.S. Geological Survey in cooperation with the New Hampshire Department of Environmental Services, by Marilee A. Horn, Richard B. Moore, Laura Hayes, and Sarah M. Flanagan

The recently released USGS groundwater availability study developed new methods to estimate water use in 2003 and future water demand in 2017 and 2025 in the seacoast region of southeastern New Hampshire (study area include the Cocheco River watershed) This area has experienced a 37 percent population increase during 1980 to 2000. Water use activities for which estimates were developed include water withdrawal, delivery, demand, consumptive use, release, return flow, and transfer by registered and aggregated unregistered users at the census block and town scales. The study reports that domestic water demand is projected to increase by 58 percent (to 28.7 million gallons per day) from 2003 to 2025 based on projection of future population growth. Non-domestic (commercial, industrial, irrigation, and mining) water demand is projected to increase by 62 percent to 11.8 million gallons per day from 2003 to 2025.

SECTION III. COMMUNITY AND PUBLIC SUPPORT

The level of community and other public support, which is demonstrated for a river nomination will be an important factor in determining whether that river will be recommended for legislative designation. Such support may be shown by the adoption of a town resolution, a letter from selectmen, master plan excerpts, or documented support from other groups, either public or private (if private, explain the group's purpose and who is represented).

Describe the type of community and other public support which exists for the river nomination and attach appropriate documentation. Include copies of any letters of support from local elected and appointed officials.

1. Notification of Corridor Communities: Notification letters were mailed on May 23, 2008 to the Towns of New Durham, Middleton, Milton and Farmington, and the Cities of Rochester and Dover. (See copies of letters and notification cards in Appendix A).
2. Outreach to Watershed Stakeholders – Isinglass River Local Advisory Committee, Moose Mountains Regional Greenway, Strafford Rivers Conservancy, Bear Paws, Strafford County Conservation District, Milton 3 Ponds Association

SRPC prepared email announcements for the watershed stakeholders as well as for distribution to local land use boards and planning offices of the watershed communities.

SRPC will post on their website the complete Cocheco River Nomination Package submitted to NHDES. SRPC will distribute a press release announcing the submission of the Cocheco River Nomination for designation to the NH Rivers Management and Protection Program.

3. In preparation for the *Cocheco River Watershed Environmental Quality Report, 2005*, the Cocheco River Watershed Coalition wished to gain community insight into issues affecting the environmental quality of the Cocheco River. Key informants were identified and asked to respond first to a written survey and then to participate in an oral interview. Additionally, community representatives and corridor residents toured three reaches of the river corridor to gain further insight.

The data was incorporated, along with other available river data, into preparation of a report. This community involvement report was the basis for the *Watershed Restoration and Implementation Plan for the Cocheco River, 2006*. Again, public input was requested and received in development of the report. Four goals were identified regarding water quality, public perception and education, wildlife habitat, and development and stormwater impact.

A set of objectives was developed for each goal. Then eighty-five actions addressing the goals and objectives were identified; these actions would be carried out by a broad spectrum of stakeholders. Action number DSI-8, "Work to make the Cocheco River a state designated river under the NH Rivers Management and Protection Program."

4. For eleven years the Cocheco River Watershed Coalition has, among its other public participation activities, invited the public to an educational and recreational canoe trip on the Cocheco River – the Annual Cocheco River Clean-Up.



Photo by Cal Schroeder, 2008 Cocheco River Clean-Up

This event has been meant as an opportunity for experienced paddlers as well as those brand new to the river to get acquainted with the river corridor. The use of NHDES canoes has enabled the CRWC to accommodate hundreds of people from a great variety of experiences and backgrounds to learn about the river.

In 2008, CRWC educational programming at the Annual Cocheco River Clean-Up held on May 10th included participation of NHDES RMPP and VRAP staff, and distribution of an information flyer (see Appendix B) Over 100 people attended.

3. At a series of CRWC meetings in 2007-2008, the RMPP nomination has been presented and discussed, including the April meeting where Steve Couture, Rivers Coordinator, made a presentation about the designation process and benefits of designated status.
4. Media Coverage – Rochester Times and Fosters Daily Democrat
5. Other Events: Annual Meeting of the Strafford Regional Planning Commission, May 29, 2008

Refer to Appendix A for supporting materials for this Section.

SECTION IV. OTHER SUPPORTING INFORMATION

List what, if any, additional supporting information has been submitted with this river nomination.

Following are additional technical studies and reports referenced to support nomination of the Cocheco River:

Cocheco River Watershed Environmental Quality Report (February 2005); Prepared by Thomas R. Fargo and Danna B. Truslow, D.B. Truslow Associates, Rye, NH; Prepared for Cocheco River Watershed Coalition, Dover, NH

Watershed Restoration and Implementation Plan for the Cocheco River (June 2006); Prepared by Danna B. Truslow, D.B. Truslow Associates, Rye, NH; Prepared for Cocheco River Watershed Coalition, Dover, NH

New Hampshire Nutrient Criteria Development: Relationships between Nutrient and Eutrophication Parameters in Three Riverine Impoundments. A final report to the US EPA Region I by Phil Trowbridge and Paul Piszczek, NHDES 2005

A Field Guide to Common Riparian Plants in New Hampshire (October 2006) by Jen Drociak, NHDES, Volunteer River Assessment Program

Hydrology of the Cocheco River Basin, Southeastern New Hampshire by John E. Cotton, USGS Water resources Investigation Report 87-413, 1989 Transmissivity study.

Geohydrologic, Ground-Water Quality, and Streamflow Data for the Stratified –Drift Aquifers in the Bellamy, Cocheco, and Salmon Falls River Basins, Southeastern New Hampshire. by Sean M. Lawlor and Thomas J. Mack USGS Open-File Report 89-583 – Well Yield Probability Study

GIS Mapping of the Cocheco River Watershed for Restoring Native Ecosystems (2002) Strafford Regional Planning Commission. A set of ten map layers for assessment of Pre-European settlement native ecosystems, current use, and ecosystem health.

Great Bay Restoration Compendium (September 2006) by New Hampshire Estuaries Project, The Nature Conservancy, New Hampshire Coastal Program, University of New Hampshire; Available at: http://www.nhep.unh.edu/resources/pdf/great_bay_restoration-tnc-06.pdf

New Hampshire Volunteer River Assessment Program 2007 Cocheco River Watershed Water Quality Report (April 2008) by New Hampshire Department of Environmental Services, Volunteer River Assessment Program. See also reports from 1999-2006 available at: <http://www.des.state.nh.us/wmb/VRAP/cocheco.html>

Volunteer Biological Stream Data Collection Report for the Cocheco River (November 2006) by New Hampshire Department of Environmental Services, Volunteer Biological Assessment Program; Available at:

http://www.des.state.nh.us/wmb/documents/Cocheco06_VBAP.pdf. See also the report from 2005.

SECTION V. RIVER CLASSIFICATIONS

Each river or river segment that is designated by the state legislature will be placed into a river classification system. This classification system consists of four categories: Natural, Rural, Rural-Community and Community Rivers. Refer to Appendices A and B in the Guide to River Nominations, for a complete description and explanation of the river classification system and the instream protection measures which have been adopted by the state legislature for each classification. In this part of the nomination form, DES and the State Rivers Management Advisory Committee are interested in learning which river classification(s) you believe is most appropriate for your river.

1. River Segment Criteria

For each classification criteria listed below (a-d), check the one box which most accurately describes the nominated river or segment.

(a) General Description	
X	The river or segment is free flowing and characterized by high quality natural and scenic resources. The river shoreline is in primarily natural vegetation and the river corridor is generally undeveloped and development, if any, is limited to forest management and scattered housing. (Natural Rivers)
	The river or segment is adjacent to lands which are partially or predominantly used for agriculture, forest management, and dispersed or clustered residential development. Some instream structures may exist, including low dams, diversion works and other minor modifications. (Rural Rivers)
X	The river or segment which flows through developed or populated areas of the state and which possesses existing or potential community resource values such as those defined in official municipal plans or land use controls. Such a river has mixed land uses in the corridor reflecting some combination of open space, agricultural, residential, commercial and industrial land uses. It is readily accessible by road or railroad and may include impoundments or diversions. (Rural-Community Rivers)
X	The river or segment flows through populated areas of the state and possesses actual or potential resource values, with some residential or other building development near the shoreline. The river or river segment is readily accessible by road or railroad, and may include some impoundments or diversions. (Community Rivers)
(b) Length	
X	The river or segment is at least 5 miles long. (Natural Rivers)
X	The river or segment is at least 3 miles long. (Rural and Rural-Community Rivers)
X	The river or segment is at least 1 mile long. (Community Rivers)
(c) Water Quality	
No	The actual water quality of the river or segment meet Class A standards under the state's water quality standards. (Natural Rivers)
No	The actual water quality of the river or segment meets Class B standards under the state's water quality standards. (Rural, Rural-Community and Community Rivers)

(d) <u>Distance to Roads</u>	
See Below	The minimum distance from the river shoreline to a paved road open to the public for motor vehicle use is at least 250 feet, except where a vegetative or other natural barrier exists which effectively screens the sight and sound of motor vehicles for a majority of the length of the river. (Natural Rivers)
N/A	There is no minimum distance from the river shoreline to an existing road. Roads may parallel the river shoreline with regular bridge crossings and public access sites. (Rural, Rural-Community and Community Rivers)

From Table above: (d) Distance to Roads (Natural River Segment #1)

Refer to Figure 4. Natural River: Segment #1

The proposed Natural River Segment (#1) flows from the Cocheco River headwaters south of March's Pond in New Durham to Spring Street crossing in Farmington. There are 5 local road crossings within this segment (reported from north to south): Webster Road in New Durham, Middleton Road in New Durham, (off of Silver Street) in Middleton, Bay Road in Farmington, and Spring Street in Farmington. There are no other local or state highways within 250 feet of the Cocheco River within this segment.

The Middleton Road crossing in New Durham is adjacent to a large parcel of conservation lands that extends along the south side of Middleton Road to the New Durham and Middleton boundaries.

The Bay Road crossing in Farmington is bounded by protected lands - the Farmington Town Forest to the north and the New Dam Phase I subdivision open space easement.

As shown in *Figure 1 Natural River Segment #1*, a forested and/or vegetated natural barrier exists within 250 feet of the river for nearly the entire length of Segment #1 with the exception of several areas of open fields and agricultural uses.

2. River Segments

Refer to Figure 1. Base Map for location of proposed designated river segments.

Natural River Segments

Segment 1: Length = 6.39 miles

From Cocheco River headwaters south of March's Pond in New Durham to Spring Street crossing in Farmington.

Rural Community River Segments

Segment 3: Length = 4.46 miles

From 0.7 miles south of Cocheco Road Bridge north of Route 11) in Farmington to Little Falls Bridge crossing in Rochester.

Segment 5: Length = 8.14 miles

From England Road crossing in Rochester to Whittier Street crossing in Dover.

Community River Segments

Segment 2: Length = 3.71 miles

From Spring Street crossing in Farmington to 0.7 miles south of Cocheco Road Bridge north of Route 11) in Farmington.

Segment 4: Length = 10.45 miles

From Little Falls Bridge crossing in Rochester to England Road crossing in Rochester.

Segment 6: Length = 1.45 miles

From Whittier Street crossing in Dover to head of tide at Central Ave dam in Dover.

The total river length nominated for protection is 34.61 miles, from the headwaters in New Durham to the tidal limit at the Cocheco Falls Dam in Dover. The total acreage of land within the Cocheco River Corridor is 9,518 acres.

Refer to Figure 5. Cocheco Watershed and Proposed River Segments for illustration of proposed River Segments.

SECTION VI. MAP SET

Below is a map depicting the Cocheco River Watershed, River Corridor and the portion of the river nominated for designation. Refer to Figure 2. Regional Watershed and Proposed River Segments for detailed information about the proposed segment designations, lengths and locations.



Figure 1. Cocheco River Watershed and River Corridor

The Strafford Regional Planning Commission prepared a set of resource based maps for the Nomination. These maps include:

- Figure 4. Natural River: Segment #1
- Figure 5. Cocheco Watershed and Proposed River Segments
- Figure 6. FEMA 100-year Flood Plain
- Figure 7. Conservation Lands and Unfragmented Lands
- Figure 8. Existing Land Use
- Figure 9. Ground Water Hazards
- Figure 10. Native Ecosystems
- Figure 11. Soil Properties
- Figure 12. Recreational and Historical Resources
- Figure 13. Water Resources – Surface Waters, Aquifers and Wetlands
- Figure 14. Land Conservation Plan for NH's Coastal Watersheds - Core Focus Areas
- Figure 15. NH's Wildlife Action Plan - Core Focus Areas and Areas of Ecological Significance

These Figures are referenced throughout the Nomination Form for clarification and illustrative purposes.

SECTION VII. RESOURCE ASSESSMENT

1. Natural Resources

Geographic and Physical Setting

The Cocheco River watershed encompasses approximately 185.2 square miles. This watershed makes up one portion of the larger Piscataqua/Salmon Falls watershed, a significant area recognized by the U.S. Geological Survey, the U.S. Environmental Protection Agency, and other federal and New Hampshire state agencies.

Table 1. Facts and Figures About the Cocheco River Watershed [from Cocheco River Watershed Environmental Quality Report (February 2005), D.B. Truslow Associates]

Area of Cocheco River Watershed	185.2 square miles
Number of Designated Subwatersheds	8
Elevation Change Along River	700 feet
Median Daily Discharge (at Rochester gage)	71 cubic feet per second
Maximum Recorded Discharge (at Rochester gage)	2,980 cubic feet per second
Minimum Recorded Discharge (at Rochester gage)	2 cubic feet per second
Total Discharge to Estuary	9.01 billion cubic feet per year
Population of Watershed – 2000	68,689
Projected Population – 2020	83,370
Population Change from 2000 to 2020	14,681 (21.4%)
Change in Impervious Surface Area from 1999 to 2000	5.9%

(a) Geologic Resources

Briefly describe the significant geologic resources of the river and its corridor, including any unique or visually interesting features such as waterfalls, unusual rock formations, and areas of rapids. If you are unable to include such features, then simply describe the bedrock geology map. Consider geologic resources on the basis of natural history, visual, and economic interest. Indicate if the state geologist or a national or state resource assessment has identified these geologic resources as significant at a national, regional (New England), state, or local level.

Geologic History of the Cocheco River

The Cocheco River watershed has been shaped over time by geological processes. The formation of the Cocheco began about 18,000 years ago as the last glacier scraped its way across New Hampshire. The glacier was about 4,000 feet thick and its weight depressed the land, lowering inland areas, and to a lesser degree, the seacoast. As the glacier receded, pockets of ice were left in areas such as the Cocheco River basin. The runoff from these ice pockets contributed to the major sources for the present day river. After the glacier receded, the land began to rebound. During this time, the sea also rose but at a faster rate. [Source: *USGS, Water Resources of New Hampshire and Vermont, Pembroke, NH*]

Geologic Formations and Deposits

The region's geology has a major influence on the landscape and characteristics of the Cocheco River watershed. The watershed is comprised of bedrock from a variety of geologic processes – sedimentation, deformation, metamorphism, igneous activity and erosion. These rocks have been shaped by plate tectonics, glaciation, and marine inundations. Most common types of bedrock include metamorphic rocks (gneiss, slate, schist, and quartzite) and metamorphosed volcanic rocks. Major geologic units in the watershed include the Kittery Formation, Littleton Formation, and Concord Granite

The bedrock is overlain by glacial and marine deposits. Glaciation scoured and scraped the land surface multiple times, the most recent being the Late Wisconsin glaciation from 25,000-12,000 years ago. As the glaciers retreated, sand, mud and other debris were left by the melting ice to form till, and fine to coarse-grained deposits. The coarse-grained deposits are the basis for stratified-drift aquifers that are common and productive water sources in the watershed. Also following the last glaciation, coastal waters inundated the region and left marine deposits throughout the watershed – these marine deposits are found primarily in the lower areas of the watershed from Rochester downstream and are comprised of silts and clays.

Map of NH Bedrock Units In the Cocheco River Watershed [Source: USGS, Water Resources of New Hampshire and Vermont, Pembroke, NH]

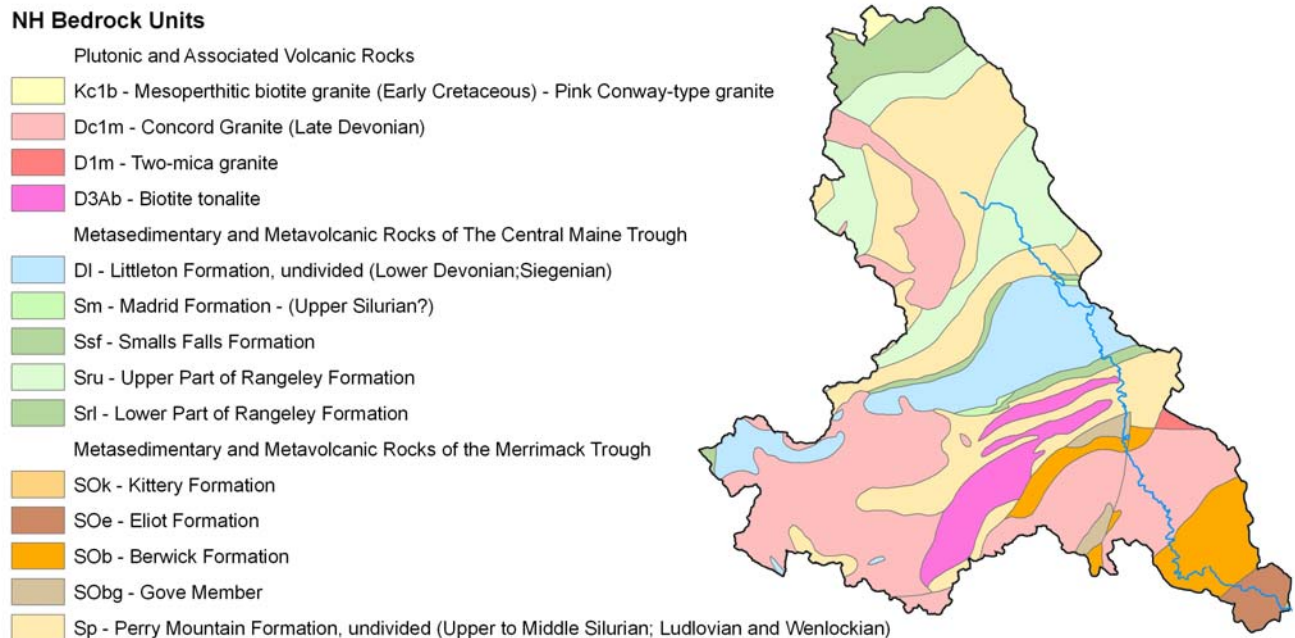


Figure 2. Geologic rock units of the Cocheco River watershed

Water Resources

The bedrock and surficial deposits are important sources of water to communities, industry, commercial facilities, and private homes. The potential yield of water from bedrock wells are highly variable from site to site, but the Cocheco watershed and other areas of the Seacoast region of New Hampshire can have, comparatively to the rest of the state, moderate to high yielding bedrock wells. The Cocheco watershed has extensive stratified drift deposits that are found along the river's course. Larger aquifers are found in the New Durham, Farmington, and Rochester areas. Nearly 20 percent of the watershed is overlain by stratified-drift aquifers, about 10 percent of these aquifers are considered to be potentially high yielding water sources.

Sources:

Hydrogeology of the Cocheco River Basin, Southeastern NH, USGS Water-Resources Investigations Report 87-4130, 1989, by John E. Cotton, 47 pg.

Factors Related to Well Yield in the Fractured-Bedrock Aquifer of NH, USGS Professional Paper 1660, 2002, by Richard Bridge Moore, G.E. Schwarz, S.F. Clark, G.J. Walsh, and J.R. Degnan, 51 pg.

Geohydrology and Water Quality of Stratified-drift Aquifers in the Bellamy, Cocheco, and Salmon Falls River Basins, Southeastern NH, USGS Water-Resources Investigations Report 90-4161, 1992, by Thomas J. Mack and Sean M. Lawlor, 65 pgs plus appendix

Bedrock Geologic Map of New Hampshire, USGS State Geologic Map, 1997, by J.B. Lyons, Bothner, W.A., Moench, R.H., and Thompson, J.B.; 2 sheets, scale 1:250,000 and 1:500,000.

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Map of Transmissivity of Stratified Drift Deposits in the Cocheco River Watershed [Source: USGS, Water Resources of New Hampshire and Vermont, Pembroke, NH]

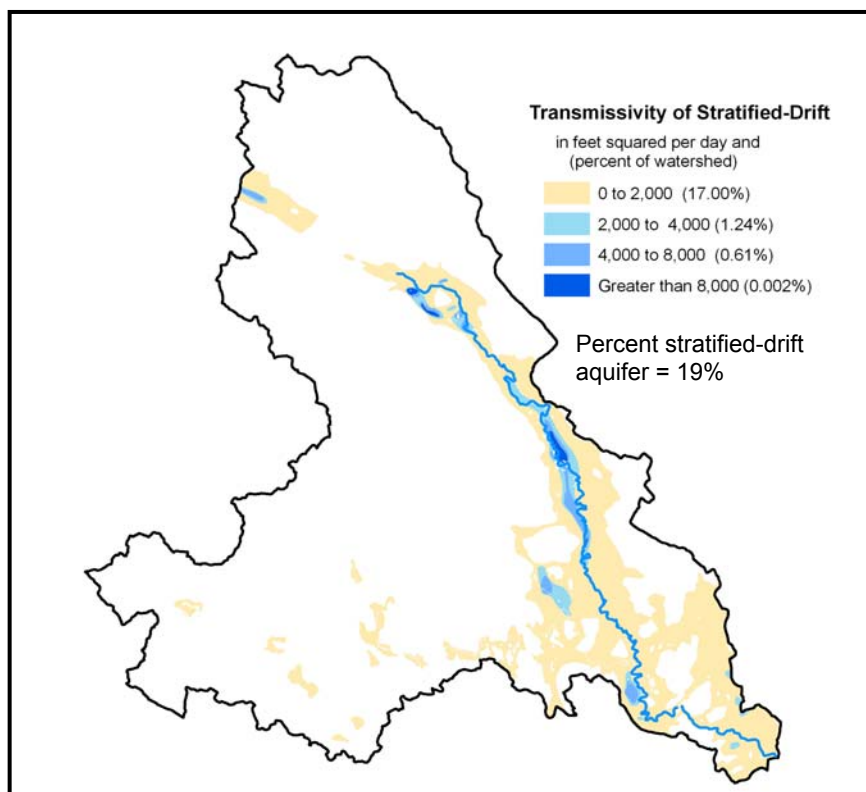


Figure 3. Transmissivity of stratified drift deposits in the Cocheco River watershed

Geology of the Cocheco River Today

The geology of today's Cocheco River landscape changes dramatically throughout the watershed. In the upper watershed, glacial till and bedrock make up the majority of the near subsurface materials. These landscapes were carved from the bedrock by glaciers and meltwater streams leaving behind areas with thin soil cover and elongated low hills called drumlins formed from the advance of the glacier, and made up largely of glacial till. During and following deglaciation, parts of the coast and areas probably as far inland as Somersworth were submerged as the coastal river basins emerged and were carved into the landscape. Clay, which can be seen in today's riverbanks, was widely deposited in the river valleys as marine sediments during submersion of inland areas by the sea. In Rochester, the Cocheco River valley is a broad sand plain with significant sand and gravel deposited over glacial till. The sand and gravel were deposited by meltwater as the glacier receded.

Just downstream of Farmington, the character of the river's geology changes significantly. Here, thick sand and gravel deposits left by retreating glaciers occupy the river bottom and valley. Sand and gravel has been commercially extracted for decades for use in construction. Broader floodplains, wetlands and back water areas occupy the lower watershed where these same meltwater deposits of sand, gravel, silts and marine clay deposits cover bedrock and glacial till. Many of these sand and gravel deposits near the mainstem of the river are considered highly productive aquifers, which could yield appreciable groundwater for public drinking water supplies. Wetlands in the middle and lower Cocheco watersheds are important areas for recharge of aquifers and to sustain the base flow of tributary streams and the river itself.

Sources: "Watershed Restoration and Implementation Plan for the Cocheco River", D.B. Truslow Associates, June 2006 and : "Cocheco River Watershed: An Historical Perspective" by Reuben F. Hull, Jr., P.E. (November 20, 1997)

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(b) Wildlife Resources

The information provided in this section reflects data and observations from many varied sources and at specific geographic locations, as there has not been a formal of comprehensive survey of wildlife inhabiting the Cocheco River corridor. It should also be noted that the information presented in this section is not all inclusive, and it is likely that many other wildlife species occur within the Cocheco River corridor but that are not documented.

(1) Species of mammals, macroinvertebrates and birds observed in the river and river corridor.**Table 2. Mammals observed in the Cocheco Watershed**

Animal/Counts Range	New Durham	Farmington	Rochester	Dover
Deer	50-67	53-85	88-118	44-66
Beaver	11-19	3-27	51-138	17-54
Muskrat	4-12	3-12	9-29	4-63
Fisher	3-7	1-7	4-23	0-15
Mink	2-8	0-8	0-23	1-2
Otter	1-2	1-3	2-9	2-7

[Source: Captured Mammal Populations in the Cocheco River Area, 1997 to 2003, as reported to NH Fish and Game Department by licensed trappers and deer kill reported by licensed hunters]

Mammals and macroinvertebrates reported in Tables 3 and 4 below were observed and collected on the property of Turnkey Recycling and Environmental Enterprises in Rochester, NH, located off NH Route 125 at Rochester Neck Road. The Cocheco River flows across the northeastern portion of this property, with most lands east of Rochester Neck Road lying within the river corridor. Macroinvertebrates were observed on the site at three reaches, identified in the report as the Upper, Middle and Lower Cocheco River.

Table 3. Mammals observed at the property of Turnkey Recycling and Environmental Enterprises, Rochester, New Hampshire

Beaver	Moose	Shorttail Shrew
Deer Mouse	Northern Flying Squirrel	Shorttail Weasel
Eastern Chipmunk	Porcupine	Star-nosed Mole
Eastern Gray Squirrel	Raccoon	Striped Skunk
Hairy-tailed Mole	Red Fox	Whitetail Deer
Meadow Mole	Red Squirrel	Woodchuck

[Source: Biodiversity Baseline Inventory and Management Plan (August 1995) prepared for Turnkey Recycling and Environmental Enterprises, Strafford County, New Hampshire by Rust Environment and Infrastructure]

Table 4. Macroinvertebrates observed at the property of Turnkey Recycling and Environmental Enterprises, Rochester, New Hampshire

Latin Name	Common Name
Ephemeroptera – Heptageniidae	Mayfly
Anisoptera – Gomphidae, Aeshnidae	Dragonfly
Zygoptera – Coenagrionidae, Calopterygidae	Damselfly
Tricoptera – Hydropsychidae, Polycenropodidae	Caddisfly
Diptera – Tipulidae	Crane fly
Hemiptera – Corixidae, Belostomatidae, Nepidae	Water boatmen
Megaloptera – Sialidae	Alderfly
Gastropoda (Mollusca)	Snail
Isopoda (Crustacea)	Pillbug, Sowbug
Anelida – Hirudinea	Leech

[Source: Biodiversity Baseline Inventory and Management Plan (August 1995) prepared for Turnkey Recycling and Environmental Enterprises, Strafford County, New Hampshire by Rust Environment and Infrastructure]

Table 5. Bird species observed in the river and river corridor

Black Duck, American	Hawk, Broad-winged	Sparrow, White-throated
Blackbird, Red-winged	Hawk, Red-tailed	Starling
Bluebird, Eastern	Heron, Great Blue	Starling, European
Bobolink	Heron, Green-backed	Swallow, Barn
Bunting, Indigo	Jay, Blue	Swallow, Tree
Canada goose	Junco, Dark-eyed	Swift, Chimney
Canada warbler	Kestrel, American	Thrasher, Brown
Cardinal, Northern	Killdeer	Thrush, Hermit
Catbird, Gray	Kingbird, Eastern	Thrush, Wood
Chickadee, Black-capped	Kingfisher, Belted	Titmouse, Tufted
Chipping sparrow	Kinglet, Ruby-crowned	Towhee, Rufous-sided
Common golden-eye	Mallard	Tree Sparrow, American
Common moorhen	Meadowlark, Eastern	Turkey vulture
Cowbird, Bronze-headed	Mockingbird, Northern	Turkey, wild
Creepers, Brown	Nuthatch, White-breasted	Veery
Crow, American	Oriole, Northern	Vireo, Red-eyed
Dove, Mourning	Osprey	Vireo, Solitary
Dove, Rock	Ovenbird	Warbler, Bay-breasted
Downy woodpecker	Owl, Barred	Warbler, Black-and-white
Finch, House	Parula, Northern	Warbler, Blackburnian
Finch, House	Peregrine falcon	Warbler, Black-throated Green
Finch, Purple	Phoebe, Eastern	Warbler, Blue-winged
Flicker, Northern	Redstart, American	Warbler, Pine
Flycatcher, Great Crested	Robin, American	Warbler, Prairie
Flycatcher, Least	Sandpiper, Upland	Warbler, Yellow
Flycatcher, Olive-sided	Siskin, Pine	Waxwing, Bohemian
Goldfinch, American	Snow bunting	Waxwing, Cedar
Grackle, Common	Sparrow, American Tree	Wood thrush
Great blue heron	Sparrow, Chipping	Woodcock, American
Greater yellowlegs	Sparrow, Field	Woodpecker, Downy
Green heron	Sparrow, House	Woodpecker, Pileated
Green-winged teal	Sparrow, House	Wood-Pewee, Eastern
Grosbeak, Evening	Sparrow, Lincoln's	Wren, House
Grosbeak, Rose-breasted	Sparrow, Savannah	Yellowthroat, Common
Gull, Great Black-backed	Sparrow, Song	
Gull, Herring	Sparrow, Swamp	

[Source: Volunteer records of observations at Strafford County Farm and various locations along the Cocheco River in Rochester and Dover]

(2) List any endangered or threatened animals which are supported by the river and river corridor environment. Include location, if known. Check whether these animals are endangered [E] or threatened [T] species and if they are significant at a national [N] or state [S] level.

Table 6. Known occurrences of rare species and exemplary natural communities within 0.25 miles of the Cocheco River, between the headwaters in New Durham and the confluence with the Piscataqua River [Source: New Hampshire Natural Heritage Bureau 2008]

Species	Location	Listing Status		Rank	Precision	Last Observed
		Federal	State			
Bald Eagle (<i>Haliaeetus leucocephalus</i>)	Dover	M	E	NR	S	2006
Common Moorhen (<i>Gallinula chloropus</i>)	Rochester	--	--	H	S	1983
Osprey (<i>Pandion haliaetus</i>)	Dover	--	T	NR	S	2007
Pied-billed Grebe (<i>Podilymbus podiceps</i>)	Rochester	--	E	NR	S	1997
Upland Sandpiper (<i>Bartramia longicauda</i>)	Dover	--	E	NR	S	1996

Listing Status
T = Threatened
E = Endangered
M = Monitored

Rank
A-D = Excellent (A) to poor (D)
H = Historical (last seen >20 years ago)
X = Extirpated
NR = Not Ranked

Precision
S = Location known to within ca. 300 feet
M = Location known to within ca. 1.5 miles
G = Location known only to place name (ca. 5 miles)

Expected Changes to the NH Threatened and Endangered Species List

[Source: Personal email communication of August 11, 2008 from Charles Bridges, Habitat & Diversity Programs Administrator, NH Fish and Game Department]

Changes to the state's **Threatened and Endangered Species List** will not be finalized until the end of the rule making process in September 2008. Several species' state status are expected to be amended as follows:

Species	Existing state status	Expected state status	Recommended for addition
Bald Eagle	E	T	--
Pie-billed Grebe	E	T	--
Blandings Turtle	--	--	E
New England Cottontail	--	--	E
Spotted Turtle	--	--	T
Bridle Shiner	--	--	T
Osprey	Recommended for removal		--

The NH Fish & Game Department and NH Audubon have been fostering the recovery of the state-listed "threatened" Osprey since NH's breeding population was nearly decimated in the 1970's by food chain contamination. As the species rebounds, there are few locations where nesting sites are accessible for viewing by the public. One such site is located at Strafford County Farm in Dover where there is a nesting platform along the banks of the Cocheco River. The nest was installed in 2003 and was first occupied by nesting Osprey in Spring 2004. As reported above, the Osprey is recommended for removal from the state's Threatened and Endangered Species List because the number of breeding pairs has reached a level indicating recovery of the species. Monitoring of Ospreys will continue as they are a species of concern.

(3) List significant wildlife habitat which is supported by the river or to which the river is integral, for game and non-game wildlife populations. Identify if the habitat has been determined to be exceptionally diverse, very diverse, or moderately diverse by the NH Fish and Game Department or the U.S. Fish and Wildlife Service.

Table 7. Significant wildlife habitat supported by the river for game and non-game wildlife populations

Significant Habitat	Source
<i>Cocheco River Corridor</i>	
<i>Core Focus Areas and Supporting Landscape</i>	
Cocheco Headwaters (New Durham, Middleton)	Land Conservation Plan
Blue Hills (Farmington)	Land Conservation Plan
Rochester Heath Bog (Rochester)	Land Conservation Plan
Rochester Neck (Rochester)	Land Conservation Plan
Highest Quality Habitat in NH	Wildlife Action Plan
Highest Quality Habitat in a Biological Region	Wildlife Action Plan
<i>Cocheco Watershed</i>	
<i>NH Fish & Game Conservation Focus Areas</i>	Wildlife Action Plan
Highest Quality Habitat in NH	Wildlife Action Plan
Highest Quality Habitat in a Biological Region	Wildlife Action Plan

Land Conservation Plan for New Hampshire's Coastal Watersheds

The Land Conservation Plan for New Hampshire's Coastal Watersheds (2007) by The Nature Conservancy and its state, local and non-profit partners, recognizes four Core Focus Areas and their Supporting Landscapes located wholly or partially within the Cocheco River corridor and watershed. Refer to Figure 14 for a map of the Core Focus Areas and Supporting Landscape Areas.

Wildlife Action Plan (2007), NH Fish & Game

As reported by the *New Hampshire Wildlife Action Plan* (U.S. Fish & Wildlife Service, 2006, available at http://www.wildlife.state.nh.us/Wildlife/wildlife_plan.htm) the Cocheco contains several Core Focus Areas and highest quality habitat in NH and in a biological region (as defined in the plan). Refer to Figure 15 for a map of the Core Focus Areas and Highest Quality Habitat Areas.

(4) Determine if the river corridor is important for the movement of wildlife between large habitat areas. If it is, explain why.

Waterfowl and Migratory Birds

In 1997 the Great Bay Resource Protection Partnership prepared a Habitat Protection Plan for the Great Bay area that concentrated on protection and restoration of significant habitat for waterfowl and other migratory birds, fish and wildlife. This Partnership of several state and federal agencies and several environmental organizations evolved in response to the North American Waterfowl Management Plan. The Partnership identified over 14,000 acres of high value habitat in the Great Bay watershed (involving 24 communities) as candidates for further protection. In Dover there are over 6000 acres of significant habitat and associated lands in six different areas within the City that have been identified by the Partnership.

This Partnership is a group of statewide and local-regional private, nonprofit conservation organizations, federal and state public agencies, municipalities and private landowners that was organized in 1994 to support the North American Waterfowl Management Plan (1986) and Wetland Conservation Act (1989). The Partnership has been active in land protection efforts in the region.

Land Conservation Plan for New Hampshire's Coastal Watersheds (2007), The Nature Conservancy

The Land Conservation Plan for New Hampshire's Coastal Watersheds (2007) by The Nature Conservancy and its state, local and non-profit partners, recognizes four Core Focus Areas and their Supporting Landscapes located wholly or partially within the Cocheco River corridor, including: Cocheco Headwaters

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(New Durham, Middleton), Blue Hills (Farmington), Rochester Heath Bog (Rochester), Rochester Neck (Rochester).

As shown on the attached map (Figure 11), the river's riparian corridor provides critical connections between the Cocheco Headwaters and Blue Hills Core Focus Areas and Supporting Landscape, and within the Rochester Neck Core Focus Area and Supporting Landscape. The Core Focus Areas and Supporting Landscape areas, and the forested lands that form connections between them, provide stopover areas and essential habitat for migratory birds and mammals.

In addition, the Core Focus Areas and Supporting Landscape areas provide primary habitat for several endangered plant and animal species listed in Section VII.1.b.2 and Section VII.1.c.1-2, as well as a variety of common species listed in Section VII.1.b.1.

Wildlife Action Plan (2007), NH Fish & Game

The New Hampshire Wildlife Action Plan identifies the Cocheco River corridor as containing highest quality habitat in NH and in a biological region (as defined in the plan) and the watershed as containing several Core Focus Areas. As shown in Figure 12, the areas identified as highest quality habitat in NH and in a biological region within the Cocheco River corridor are numerous and consistently present throughout the entire length of the corridor.

(c) Vegetation and Natural Communities

(1) List the plant species commonly found in the river and river corridor

Table 8. Common Plant Species in the river and river corridor

[Source: Observations by: volunteers at mainstem water quality monitoring sites; participants at Annual River Cleanup 1999-2007; observations at Henderson Property, Rochester and County Farm, Dover]

Emergent Herbaceous Plants	Woody Shrubs	Trees
Arrowhead/Duck Potato	Arrow-wood	American Basswood/Linden
Blue Flag Iris	Buttonbush	American Beech
Blue Vervain	Elderberry/Black-Berried Elder	American Hornbeam /Ironwood/Blue Beech
Boneset/Thoroughwort	<i>Glossy Buckthorn*</i>	Black Cherry
Bur-reed	Highbush Blueberry	Eastern Hemlock
Cardinal Flower	Hobblebush	Eastern White Pine
Cattail	Honeysuckle	Red Maple
<i>Common Reed (Phragmites)*</i>	<i>Japanese Knotweed*</i>	Red Oak
Jewelweed/Spotted Touch-Me-Not	Meadowsweet	Shagbark Hickory
Joe Pye Weed	<i>Multiflora Rose*</i>	Silver Maple
Pickerelweed	Northern Wild Raisin/Withrod Viburnum	White Ash
<i>Purple Loosestrife*</i>	Shadbush/Serviceberry/Juneberry	White Oak
Submerged Aquatic Plants	Sheep Laurel/Lambkill	Yellow Birch
Bladderwort	Speckled Alder	Gray and White Birch
Coontail/Hornwort	Steeplebush	
<i>Milfoil (variable)**</i>	Winterberry Holly/Black Alder	Ferns
Climbing Vines	Witch Hazel	Cinnamon
<i>Bittersweet*</i>		Royal
Poison Ivy		Sensitive
Riverbank Grape		Christmas/Sword
Virginia Creeper		

* *Invasive or Exotic Species*

** *Invasive species at Sunrise Lake in Middleton and Cocheco mainstem in Rochester [Source: Aquatic Plant Sites in New Hampshire at http://www.des.state.nh.us/wmb/exoticspecies/documents/milfoil_map_list.pdf]*

(2) List any endangered or threatened plant species that are supported by the river and river corridor environment. Include location, if known. Check whether these plants are endangered [E] or threatened [T] species and if they are significant at a national [N] or state [S] level.

Table 9. Known occurrences of rare plant species and exemplary natural communities within 0.25 miles of the Cocheco River, between the headwaters area in New Durham and the confluence with the Piscataqua River [Source: New Hampshire Natural Heritage Bureau 2008]

Species	Location	Listing Status		Rank	Precision	Last Observed
		Federal	State			
Eastern Lilaeopsis (<i>Eleocharis parvula</i>)	Dover	--	T	C	S	2004
Engelmann's Quillwort (<i>Isoetes engelmannii</i>)	Dover	--	E	H	M	1933
False Water Pimpernel (<i>Samolus valerandi</i> sp. <i>parviflorus</i>)	Dover	--	T	C	S	2004
Inflated Sage (<i>Carex bullata</i>)	Rochester	--	E	B	S	1989
Piled-up Sedge (<i>Carex cumulata</i>)	Rochester	--	E	D	S	1994
River Bank Quillwort (<i>Isoetes riparia</i>)	Rochester	--	E	H	M	1941
Small Spike-rush (<i>Eleocharis parvula</i>)	Dover	--	T	C+	S	2004

Wild Lupine (<i>Lupinus perennis</i>)	Rochester	--	T	H	M	1950
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(3) List any vegetative communities supported by the river and the river corridor environment which have been identified as "exemplary natural ecological communities" by the New Hampshire Natural Heritage Inventory. Include location, if known.

Table 10. Exemplary Natural Ecological Communities [Source: Ecological Inventory of the Cocheco River and Follett's Brook Watersheds, NH Natural Heritage Bureau, 2004]

Exemplary Natural Ecological Community	Location
Appalachian oak-pine forest	Middle Road, East of (Dover), Cocheco River West (Dover)
Hemlock-hardwood-pine forest system	Middle Road, East of (Dover)
Low-gradient silty-sandy riverbank system	Cocheco River West (Dover)
Poor level fen/bog system	No. Bottom Pond (Dover)
Red maple floodplain forest	Blackwater/Clark Brook Vicinity (Dover)
Temperate minerotrophic swamp system	Mallego Plains (Dover)
Temperate minor river floodplain system	Cocheco River West (Dover)

The dominant ecosystem types within the river corridor are Dry Coastal Forest and Moist Coastal Forest. These ecosystem types are also widespread throughout the watershed. Bogs, an uncommon ecosystem type, are also present within the watershed in many of the Core Focus Areas identified in The Land Conservation Plan for New Hampshire's coastal Watersheds and in the New Hampshire Wildlife Action Plan. Refer to Figure 8 for a map of the following Native Ecosystems.

Table 11. Native ecosystem types within the river corridor and watershed

Native Ecosystem	Description	Acreage
Bog	Generally acidic wetlands with limited (or no) surface and ground water inputs and characterized by the accumulation of peat. They include numerous rare natural communities like Atlantic white cedar swamps and black spruce bogs, and specialized species (such as pitcher plants), sphagnum moss and dwarf shrub species	324.2
Dry Coastal Forest	Xeric uplands; Forests dominated by trees which are taller than 15 feet in height or 4 inches in diameter, including regenerating forests dominated by seedlings and saplings less than 15 feet in height or 4 inches in diameter; also includes abandoned agricultural land in early succession forb/grasslands	5,038.1
Moist Coastal Forest	Mesic uplands; Forests dominated by trees which are taller than 15 feet in height or 4 inches in diameter, including regenerating forests dominated by seedlings and saplings less than 15 feet in height or 4 inches in diameter; also includes abandoned agricultural land in early succession forb/grasslands	2,322.5
Surface Waters	Lotic – fresh flowing water in streams, rivers, lakes and ponds Lentic – fresh still water	401.8
Wet Coastal Forest	Hydric – hydrologic regime of wetlands;	1,388.5
Total		9,475.2

[Source: Native Ecosystems. This GIS data layer supplied by Donald Richard, USDA Natural Resources Conservation Service. Native Ecosystems refers to the theoretical ecosystems native to New Hampshire prior to European settlement. For more information on the process of identifying these ecosystem types refer to <http://www.nh.nrcs.usda.gov/> and go to "Ecosystem Restoration." Figure 10. Native Ecosystems map is based on results of the draft report "Managing and Restoring Native Ecosystems: A Guide for New Hampshire Towns" prepared by Alan P. Ammann Ph.D., Biologist.]

(d) Fish Resources

(1) List the fish species commonly found in the river.

Table 12. Fish Species in the River [Source: Cocheco River Watershed Environmental Quality Report (February 2006) from Dionne, Mike. New Hampshire Fish and Game Department. Cocheco Fish Ladder data and personal communication, 2004]

Rainbow Trout	Atlantic Salmon	Bridle Shiner
Blueback Herring	Rainbow smelt	American Eel
Brook Trout	American Shad	Pumpkinseed
Common White Sucker	Yellow Perch	Eastern Chain Pickerel
Eastern Brook Trout	Smallmouth Bass	Shiner
Alewife	Bluegill	Sea Lamprey
Brown Trout	Fallfish	Brown bullhead
Largemouth Bass	Striped Bass	

(2) List any endangered or threatened fish species which inhabit the river. Check whether these fish are endangered [E] or threatened [T] species and if they are significant at a national [N] or state [S] level.

Table 13. Known occurrences of rare fish species and exemplary natural communities within 0.25 miles of the Cocheco River, between the headwaters in New Durham and the confluence with the Piscataqua River (Source: New Hampshire Natural Heritage Bureau 2008)

Species	Location	Listing Status		Rank	Precision	Last Observed
		Federal	State			
Bridle Shiner (<i>Notropis bifrenatus</i>)	Farmington	--	--	NR	S	2005

Note: The NH Fish & Game Department (NHFGD) is proposing Bridled Shiner for listing as a State Threatened species [Source: personal communication of May 1, 2008 from John Magee, NHF&G]

The small tributaries of the Cocheco River watershed contain wild brook trout and wild brown trout, one of few wild populations of wild brown trout in New Hampshire. Currently, at NHFGD and nationally, there is much emphasis on protecting and restoring eastern brook trout. The existence of wild brook trout in the Cocheco River watershed is therefore a significant occurrence [Source: personal communication of May 1, 2008 from John Magee, NHF&G].

(3) Describe the presence and location of spawning beds, feeding areas, and other significant aquatic habitat for fish populations. Determine if the habitat is exceptionally diverse, very diverse or moderately diverse as determined by the NH Fish and Game Department or the U.S. Fish and Wildlife Service.

Table 14. Spawning beds, feeding areas, and other significant aquatic habitat for fish populations

Significant Habitat	Diversity Rating
Cocheco River mainstem and tributaries in the watershed	Very Diverse: Most freshwater fish in the watershed use any and all available and suitable spawning habitat in the Cocheco River and its tributaries. Some species likely use only the tributaries (i.e. brook trout, although they may spawn in some places in the Cocheco mainstem) while others certainly use the Cocheco River itself as primary spawning habitat (i.e. bridge shiner spawn amongst aquatic vegetation in the river).
Impoundments and Riverine Sections of the Cocheco mainstem	Very Diverse: Significant aquatic habitat for anadromous fish species. Moderately Diverse: Slower moving sections of the river provide habitat for American eel rearing habitat.

[Source: personal communications of May 1, 2008 from John Magee, NHF&G, and May 14, 2008 from Cheri Patterson, NHFGD]

(4) Indicate whether the significant fisheries found in the river rely on natural reproduction or a stocking program. If fish populations rely on a stocking program, indicate whether they are partly or wholly dependent on the program.

The Cocheco fishery is a statewide resource. The NH Fish and Game Department manages and stocks trout in the Cocheco River without a closed fishing season from the Route 125 Bridge in Rochester downstream to the confluence with the Cocheco River. The Great Bay Chapter of Trout Unlimited developed a trout restocking program for the Cocheco River and one of its major tributaries, the Isinglass River.

(5) Is the river a viable anadromous fish resource? If yes, identify any on-going or planned restoration programs.

Historic Resources

Historical references document the abundance of salmon in the Cocheco River and the drastic decline in this species following installation of head of tide dams beginning in the 1700's. As a result of mill development along the river, sources of contamination and river uses contributed to the decline of salmon including: sawdust, sewage, agricultural runoff, other instream constraints such as culverts, harvesting pressures and habitat alteration.

Located in downtown Dover, the Central Ave dam (a hydroelectric facility) is sited at the first falls on the river and was historically a barrier to all diadromous fish species in the river other than American eels, sea lamprey, and under certain flow conditions, Atlantic salmon. Today, a denil fishway installed at Central Ave dam passes both species of river herring, American eels, sea lamprey, and American shad. Upstream of the Central Ave dam is a natural barrier passable only to sea lamprey, American eels and Atlantic salmon. A second dam, Watson Waldron (also a hydroelectric facility), exists upstream of the natural barrier.

[Source: *Great Bay Estuary Restoration Compendium, 2006*; by Jay Odell (The Nature Conservancy), Alyson Eberhardt (University of New Hampshire), Dr. David Burdick (University of New Hampshire) and Pete Ingraham (The Nature Conservancy)]

Current Resources

Overall, the Cocheco has a diverse and healthy population of returning anadromous fish. The river is one of three most productive rivers for river herring from the monitored Great Bay tributaries. The following species have been identified in the Cocheco River fish ladder by NH Fish and Game: Alewife, Blueback Herring, American Shad, Sea Lamprey, American Eel, Atlantic Salmon, Brown Trout, Rainbow Trout, Eastern Brook Trout, Fallfish, White Sucker, Smallmouth Bass, Largemouth Bass, Striped Bass, tiger Trout, Bluegill, and Creek Chub. [Source: Cocheco River Watershed Environmental Quality Report (February 2006), and personal communication of May 14, 2008 from Cheri Patterson, NHFGD]

In recent years the striped bass populations have increased throughout the Eastern seaboard and has been observed in Great Bay and tributaries including the Cocheco River according to the NH Fish & Game Department (NH F&G). River herring (blueback herring and alewife), anadromous fishes, migrate up the Cocheco to spawn in fresh water via the fish ladder at Cocheco Falls in downtown Dover. Since 1989 there has been a general increase in the migration of this species as reported by the NH F&G. However, there have been years that have had low returns for a variety of reasons such as flood conditions or droughts affecting survivability. The Atlantic salmon, once a very abundant species, is only found as a stocked species today. An Atlantic salmon fry stocking program was initiated in 1988 in two coastal river systems (Cocheco and Lamprey Rivers) to produce a recreational fishery. Some years had no returns (1997 and 1998) while other years only marginal returns (three returns in 1999). The program was terminated in 2003 due to not producing returns to fulfill the project goals. During the 1980's NH F&G stocked the Cocheco, Lamprey and Exeter Rivers with American shad. Only the Exeter is currently stocked with this species. However, since 1988, when the stocking stopped in the Cocheco, there remains a residual run of American shad.

Between 1980 and 1988, NH F&G stocked the Cocheco, Lamprey and Exeter Rivers with American shad. This restocking effort was discontinued in the Cocheco River, as concentration focused on restoration efforts on the Exeter River. The NHFGD considers the Cocheco River one of three of the most productive anadromous fish river systems along the NH coast.

[Source: *Fish and Wildlife Resources Section of the 2001 Dover Master Plan, Natural Resources Chapter and NH Fish and Game Department*]

Habitat restoration efforts on the Cocheco River include elimination of instream structures/blockage by removal of the Gonic Sawmill dams.

Sources:

Fish and Wildlife Resources Section of the 2001 Dover Master Plan, Natural Resources Chapter

Great Bay Estuary Restoration Compendium, 2006; by Jay Odell (The Nature Conservancy), Alyson Eberhardt (University of New Hampshire), Dr. David Burdick (University of New Hampshire) and Pete Ingraham (The Nature Conservancy)

(e) Water Quality

(1) Check the state's water quality classification which applies to this river or segment under state law.

Class A		Class B	X	Class C	
---------	--	---------	---	---------	--

(2) According to readily available information, what is the actual water quality of this river under the state's water quality standards?

Class A		Class B	See Below	Class C	
---------	--	---------	-----------	---------	--

(3) If the river is not currently supporting its water quality classification, identify the existing major causes of deficient water quality (e.g., industrial or sewage pollutants, agricultural fertilizer run-off) and possible corrective measures (e.g., regulations, enforcement, local and use controls).

A great deal of data has been collected about water quality in the Cocheco River. The Cocheco River Watershed Coalition and many others are working to better understand the components of the river system in order to restore water quality. The Watershed Restoration and Implementation Plan for the Cocheco River (June 2006) proposes various objectives and actions to meet these restoration goals and to restore water quality to the river.

2008 Section 305(b) Report and 303(d) List developed using the 2008 Consolidated Assessment and Listing Methodology (CALM) Water Quality Data

Following is a description of results of the CALM data for all 19 assessment units (Aus) on the mainstem of the Cocheco River by Use Category.

Summary of Data by Use Category

Aquatic Life

9 of 19 AUs are impaired for DO and pH (with BMB pollutant flag at one site). 3 of 9 AUs reported as category 5-M as impaired by a pollutant that requires a TMDL. The impairment is relatively slight or marginal. 5 of 9 AUs reported as category 5-P as impaired by a pollutant that requires a TMDL. The impairment is more severe and causes poor water quality.

1 of 19 AUs are impaired for aluminum, lead and pH and reported as category 5-P - impaired by a pollutant that requires a TMDL. The impairment is more severe and causes poor water quality.

1 of 19 AUs are impaired for aluminum, copper, DO, iron, lead, total phosphorous, and pH as category 5-P - impaired by a pollutant that requires a TMDL. The impairment is more severe and causes poor water quality.

Drinking Water After Treatment

19 of 19 AUs reported as category 2-G, as meeting water quality standards by a relatively large margin.

Fish Consumption - Mercury

19 of 29 AUs (category 4A-M) are impaired per the CALM for mercury (from atmospheric deposition), which is a pollutant and an EPA approved TMDL; however, the impairment is relatively slight or marginal.

Primary Contact Recreation - E.coli

11 of 19 AUs are impaired per the CALM for E.coli.

6 AUs are category 5-M, impaired by a pollutant that requires a TMDL. The impairment is relatively slight or marginal.

5 AUs are category 5. The impairment is more severe and causes poor water quality.

Secondary Contact Recreation

8 of 19 AUs reported as category 2-G, as meeting water quality standards by a relatively large margin.

3 of 19 AUs reported as category 2-G, as meeting water quality standards but only marginally.

6 of 19 AUs reported as category 3-ND. There is no data, or the data is unusable for the parameter, Designated Use or AU.

2 of 19 AUs reported as category 3-PAS. There is some insufficient data to assess per the CALM, however, the data that is available suggests that the parameter is potentially attaining standards (PAS).

The 2008 Section 305(b) Report and 303(d) List Water Quality Data is summarized in Table 15 on the following page (assessment units are listed from headwaters south).

Table 15. 2008 Section 305(b) Report and 303(d) List for the Cocheco River (19 Assessment Units on the river's mainstem listed in order from headwaters south to the head of tide in Dover)

DES USE Category	Aquatic Life	Drinking Water After Treatment	Fish Consumption	Primary Contact Recreation	Secondary Contact Recreation	Wildlife
Assessment Unit						
NHRIV600030601-02	5-M	2-G	4A-M	5-P	2-M	3-ND
Pollutant flag	pH		Mercury	E.coli		
NHRIV600030601-05	5-M	2-G	4A-M	2-M	2-G	3-ND
Pollutant flag	pH		Mercury			
NHIMP600030601-02	3-ND	2-G	4A-M	3-ND	3-ND	3-ND
Pollutant flag			Mercury			
NHRIV600030601-09	5-M	2-G	4A-M	5-M	2-G	3ND
Pollutant flag	Lead, pH		Mercury	E.coli		
NHRIV600030603-01	5-P	2-G	4A-M	5-P	2-G	3-ND
Pollutant flag	Aluminum, copper, DO, iron, lead, total phosphorous, pH		Mercury	E.coli		
NHRIV600030603-06	5-P	2-G	4A-M	5-P	2-M	3-ND
Pollutant flag	Aluminum, lead, pH		Mercury	E.coli		
NHIMP600030603-01	5-P	2-G	4A-M	5-M	2-G	3-ND
Pollutant flag	DO, pH		Mercury	E.coli		
NHRIV600030603-07	3-ND	2-G	4A-M	3-PAS	3-PAS	3-ND
Pollutant flag			Mercury			
NHRIV600030603-08	5-P	2-G	4A-M	5-P	2-M	3-ND
Pollutant flag	BMB, pH		Mercury	E.coli		
NHRIV600030607-14	3-ND	2-G	4A-M	3-ND	3-ND	3-ND
Pollutant flag			Mercury			
NHRIV600030607-15	4B-M	2-G	4A-M	3-ND	3-ND	3-ND
Pollutant flag	DO		Mercury			
NHRIV600030608-03	5-P	2-G	4A-M	5-M	2-G	3-ND
Pollutant flag	DO, pH		Mercury	E.coli		
NHRIV600030608-14	5-M	2-G	4A-M	3-ND	3-ND	3-ND
Pollutant flag	Iron		Mercury			
NHIMP600030608-02	5-P	2-G	4A-M	5-M	2-G	3-ND
Pollutant flag	pH		Mercury	E.coli		
NHRIV600030608-05	5-P	2-G	4A-M	5-M	2-G	3-ND
Pollutant flag	pH		Mercury	E.coli		
NHIMP600030608-04	5-P	2-G	4A-M	5-M	2-G	3-ND
Pollutant flag	pH		Mercury	E.coli		
NHIMP600030603-02	3-ND	2-G	4A-M	3-ND	3-ND	3-ND
Pollutant flag			Mercury			
NHIMP600030607-02	5-M	2-G	4A-M	5-P	3-PAS	3-ND

Cocheco River Nomination Form

NH Rivers Management and Protection Program

Submitted May 29, 2008

Addenda July 23; August 19; October 1, 2008

Pollutant flag	pH		Mercury	E.coli		
NHIMP600030607-03	3-ND	2-G	4A-M	3-ND	3-ND	3-ND
Pollutant flag			Mercury			

BMB = Benthic-Macroinvertebrate Bioassessments (Streams)

See table below for descriptions of the NHDES categories assigned to the designated uses in Table 15 above.

Table 16. List of NHDES Categories as reported in the 2008 CALM Report for the Cocheco River

NH DES Category	General Description (The same categories are used at the AU, Use, and Parameter Level. This table is intended to give an overview of the NH DES Categories. See Table 3-6 in the 2008 CALM report for more detail)
2-G	Meets water quality standards by a relatively large margin.
2-M	Meets water quality standards but only marginally.
2-OBS	Parameter exceeds numeric WQC but is a natural exceedance, therefore is not a WQS exceedance and is an observed effect.
3-ND	There is no data, or the data is unusable, for the Parameter, Designated Use, or Assessment Unit.
3-PAS	There is some but insufficient data to assess per the CALM, however, the data that is available suggests that the parameter is Potentially Attaining Standards (PAS)
3-PNS	There is some but insufficient data to assess per the CALM, however, the data that is available suggests that the parameter is Potentially Not Supporting (PNS) water quality standards (e.g., there is one exceedance).
4A-M	There is an impairment per the CALM by a parameter which is a pollutant and an EPA-approved TMDL has been completed. However, the impairment is relatively slight or marginal.
4A-P	There is an impairment per the CALM by a parameter which is a pollutant and an EPA-approved TMDL has been completed. However, the impairment is more severe and causes poor water quality conditions.
4B-M	There is an impairment per the CALM by a parameter which is a pollutant but a TMDL is not necessary since other controls are expected to attain water quality standards within a reasonable time. The impairment is marginal.
4B-P	There is an impairment per the CALM by a parameter which is a pollutant but a TMDL is not necessary since other controls are expected to attain water quality standards within a reasonable time. The impairment is more severe and causes poor water quality.
4B-T	There is a parameter which is considered a pollutant that is threatening impairment as per the CALM but a TMDL is not necessary since other controls are expected to attain water quality standards within a reasonable time.
4C-M	There is a parameter which is not considered a pollutant but is causing impairment per the CALM. The impairment is marginal as defined in DES sub-category 4A-M above.
4C-P	There is a parameter which is not considered a pollutant but is causing impairment per the CALM. The impairment is more severe and causes poor water quality as defined in DES sub-category 4A-P above.
5-M	There is an impairment per the CALM by a parameter which is a pollutant that requires a TMDL. The impairment is marginal as defined in DES sub-category 4A-M above.
5-P	There is an impairment per the CALM by a parameter which is a pollutant that requires a TMDL. The impairment is more severe and causes poor water quality as defined in DES sub-category 4A-P above.
5-T	There is an impairment per the CALM by a parameter which is a pollutant that requires a TMDL. The impairment is threatening as defined in DES sub-category 4B-T above.

(f) Natural Flow Characteristics

Briefly describe the natural flow characteristics of the river, including natural periodic variation in flow (e.g., spring run-off and summer flow amounts) and frequency and duration of flood events.

Indicate which segments of the river are free-flowing.

The Cocheco River is free-flowing from its headwaters on the southeast side of Birch Ridge in New Durham to central Rochester at City Dam, a distance of approximately 18.5 miles.

Natural Flow Characteristics

[Source: Cocheco River Watershed Environmental Quality Report (February 2005), D.B. Truslow Associates, excerpted from descriptions prepared by DES, 1990 and 1992]

The headwaters in New Durham are approximately seven miles above downtown Farmington. This uppermost reach has the greatest drop in elevation of the entire watershed, approximately 610 feet. The reach is characterized by shallow, fast-flowing water with a sand or gravel substrate. Two significant tributaries, the Ela and Mad Rivers, enter from the west in the downtown area of Farmington. The drainage area of the Cocheco River above the Farmington wastewater treatment plant is 43.8 square miles.

Below Farmington, the Cocheco River meanders along a small swampy area, then through large glacial outwash deposits where sand and gravel excavation takes place today. The Pokamoonshine Brook and Rattlesnake River enter the Cocheco River downstream of the Farmington outfall and upstream of Rochester. Two landfills, the Farmington landfill and the Cardinal landfill (private) are located between these two tributaries. Between Farmington and northern Rochester, the river's elevation drop is minimal. From above Farmington to the Little Falls Road Bridge in Rochester, the river drops approximately 15 feet in elevation in 6.6 miles. Its width averages about 25 feet and the average depth increases from about two feet to approximately five feet.

Below Little Falls Road Bridge crossing to the Rochester Wastewater Treatment Plant (RWTP) outfall, there are four dams in 4.9 miles. This segment is characterized by alternating sections of flat, slow-moving water with sediment deposits behind the dams, and rapid areas of fast-moving water over scoured rocky substrate. The segment from the RWTP outfall to Watson-Waldron Road dam in Dover is a typical meandering, mature river basin with varying depth and occasional deep pools. River width averages 60 feet with a range from 30 to 100 feet. Near the middle of this segment a major tributary, the Isinglass River, joins the Cocheco River from the west. The Isinglass River drains approximately 73 square miles. The Watson Road Dam is currently the only impoundment on this segment. From Watson Road to Whittier Falls there is a noticeable drop in elevation marked by bedrock scouring and fast water. The last 3.3 mile segment from Watson Road Dam to the head of tide at Cocheco Falls dam in Dover has fewer meanders and backwater areas than the previous segment.

Table 17. Cocheco River linear and unobstructed miles, and stream order miles to head of tide at Central Ave dam in Dover

Stream Order contributing to mainstem	Mainstem river miles	Currently unobstructed upstream miles (including tributaries)
First	3.9	
Second	6.3	118.5
Third	14.7	6.3
Fourth	15.4	0.3

[Source: *Great Bay Estuary Restoration Compendium, 2006*; by Jay Odell (The Nature Conservancy), Alyson Eberhardt (University of New Hampshire), Dr. David Burdick (University of New Hampshire) and Pete Ingraham (The Nature Conservancy)]

Stream Flow Statistics

[Source: Cocheco River Watershed Environmental Quality Report (February 2005), D.B. Truslow Associates and USGS Gage Station #01072800 Cocheco River Near Rochester, Strafford County]

Based on the roughly twelve-year period of USGS monitoring (1995-2007), the average daily discharge measured at the gage near the RWTP is 132 cubic feet per second (cfs). Since averages tend to be skewed by large flood discharges, a more accurate statistical indicator of "normal" discharge conditions would be the median value (50% of the measurements are greater and 50% are lower). The median daily discharge for the Cocheco River during this period as measured at Rochester was 71 cfs.

Generally, the seasonal low flows occur during early to mid-September each year. The lowest measured flows occurred on September 14 and 15, 2002 when the average daily discharge was measured at 2.0 cfs. Comparable low flows were recorded on September 4, 1995 at 2.2 cfs and September 5 and 5, 1999 at 2.5 cfs. Based on the flow data from 1995 through 2003, river flows less than 10 cfs are uncommon.

Variations in the Cocheco River's flow velocity and retention time can have a profound effect on its water quality. According to the Rochester and Farmington wastewater treatment plants, waste load allocation studies (NHDES 1990 and 1992), the NHDES estimated the amount of time it takes for a slug of water to travel across various river segments at various flow conditions. Under median flow conditions (a 70 cfs discharge at the Rochester gage), the time required for a slug of water entering the river in Farmington to travel to the Cocheco Falls dam in Dover is approximately 8 days. Under low flow conditions, the time required for a slug of water to flow the same distance might be on the order of 40 days.

From 1996 to 2006, the average annual discharge ranged from a low of 70.2 cfs in 2002 to a high of 266.0 cfs in 2006. For the same time period, the annual peak discharge ranged from a low of 959 cfs in 2002 to 5,560 cfs in 2006.

Evaluation of Discharge Data from Table 18 (on page 34)

- There appears to be no discernable pattern to the timing of the largest mean monthly discharges among any given years from 1995-2007 (shaded in gray).
- The highest mean monthly discharges in a given year are double if not more than the average discharges for that month from 1995-2007.
- The lowest mean monthly discharges for the period 1995-2007 occurred in the late summer months of August (31 percent of lowest flows) and September (62 percent of lowest flows) (shaded in blue). Biological monitoring is conducted in September to capture habitat conditions that represent the most stressed period in the river during the year.
- The highest mean monthly discharges for the period 1995-2007 occurred in the spring months of March, April and May. This is likely due to the combination of snow melt, frozen ground conditions and large precipitation events.

USGS Gage Stations

Cocheco River

The U.S. Geological Survey maintains a gage station on the Cocheco River in Rochester. The USGS estimates that there are 85.7 square miles of drainage basin upstream from this discharge monitoring station. The Rochester gage has been collecting dialing discharge measurements since March 1, 1995. Discharge data from March 1995 to the present and station gage information is available at the USGS National Water Information System Web Interface at <http://waterdata.usgs.gov/nwis/inventory>.

USGS Gage Station #01072800 Cocheco River Near Rochester, Strafford County, NH

Latitude 43°16'06", Longitude 70°58'27" NAD27
Gage Datum: 119.38 feet above sea level NGVD29
Hydrologic Unit: 01060003
Drainage Area: 85.7 square miles
Data from 1995 through present; Full Record Station

Refer to summary of gage station data for the Cocheco River on the following page.

Isinglass River

The Isinglass River gage station is part of a 2-year multipurpose streamflow monitoring network expansion project for 15 new stream gages across New Hampshire. The expansion project was requested by the New Hampshire Rivers Management Advisory Committee (RMAC), proposed by the Stream Gage Task Force (SGTF), and funding for installation was provided by the New Hampshire Legislature. The station operated in cooperation with the New Hampshire Department of Environmental Services.

USGS Gage Station #010728700 Isinglass River, Strafford, Strafford County, NH

Strafford County, New Hampshire
Hydrologic Unit Code 01060003
Latitude 43°14'05", Longitude 70°57'25" NAD27
Drainage Area 73.6 square miles
Gage Datum 115 feet above sea level NGVD29

Table 18: Annual Average and Annual Peak Discharges of the Isinglass River

Year	Annual Average Discharge (cfs)	Annual Peak Discharge (cfs)
2003	not reported	862
2004	140	1,740
2005	158	1,780
2006	239	4,370

[Source: USGS Gage Station #010728700 Isinglass River, Strafford, Strafford County, NH,

Report of natural periodic variation in flow (e.g., spring run-off and summer flow amounts) and frequency and duration of flood events

Table 19. Annual Average and Annual Peak Discharges at Rochester
[Source: USGS Gage Station #01072800 Cocheco River Near Rochester, Strafford County, NH; Data from USGS National Water Information System: Web Interface]

Year	Annual Average Discharge (cfs)	Annual Peak Discharge (cfs)
1996	197.1	2,810
1997	181.6	3,090
1998	171.8	3,700
1999	104.3	1,310
2000	138.3	1,250
2001	113.4	1,460
2002	70.2	959
2003	113.3	969
2004	149.3	1,980
2005	171.3	2,650
2006	266.0	5,550

Table 20. USGS Surface Water Data – Surface Water Monthly Average Statistics for the Cocheco River at Rochester [Source: USGS Gage Station #01072800 Cocheco River Near Rochester, Strafford County, NH, USGS National Water Information System: Web Interface]

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1995	--	--	253.5	128.5	71.9	38.2	11.6	9.07	4.85	91.9	328.5	98.5
1996	358.9	295.4	226.7	443.1	268.2	63.7	160.7	24.7	13.0	286.3	136.9	409.3
1997	159.8	151.6	227.0	507.8	154.7	34.2	66.1	17.6	24.5	20.3	114.9	72.2
1998	149.7	226.5	414.5	168.9	179.5	567.6	105.5	22.7	31.3	53.8	50.0	50.7
1999	149.7	212.4	385.0	126.8	79.7	18.8	12.2	6.61	112.1	126.9	134.0	107.3
2000	91.8	109.0	355.3	353.6	186.3	65.5	48.8	60.3	19.7	42.7	116.1	157.6
2001	65.9	68.8	215.7	492.5	66.5	91.5	28.7	10.8	8.24	13.0	13.3	26.7
2002	28.4	59.7	159.9	164.6	208.6	134.1	24.0	4.58	6.03	19.9	86.9	115.3
2003	65.3	73.9	320.8	313.9	181.0	82.0	19.9	40.0	39.7	132.5	147.4	282.5
2004	91.5	40.8	110.0	413.6	250.1	99.3	36.4	81.3	105.0	49.4	124.1	241.7
2005	150.3	137.5	218.1	527.9	323.5	160.3	83.2	27.1	13.5	545.6	327.4	235.8
2006	301.6	247.0	118.9	150.4	727.0	314.9	156.1	36.4	21.0	194.8	398.6	213.3
2007	192.0	49.2	197.6	682.4	174.8	110.4	41.6	17.1	13.4	--	--	--
Mean Monthly Discharge	150	139	246	344	221	137	61	28	32	131	165	168

If applicable, describe purpose of and flow variations caused by impoundments, significant diversions, or channel alterations, including interbasin transfers.

Direct Withdrawal and Interbasin Transfer - City of Rochester

A current water source for the City of Rochester is the Berry River in the Isinglass River watershed. Water from this source is stored in both the Rochester Reservoir, in the Axe Handle Brook subwatershed of the Cocheco River, and in Round Pond, in the Isinglass River watershed. The City has the ability to transfer water between these impoundments, across these subwatershed boundaries. This source supplies an average daily volume of 2.1 million gallons per day (GPD), which varies seasonally from 1.8 million GPD in the winter to approximately 3.0 million GPD in the summer. [Source: Rochester Department of Public Works, 2008 correspondence]

The NHDES report *Isinglass Annual Water Use Versus Stream Flow-2004*, reports that the City of Rochester withdrew an average of 14.43 cubic feet per second from the Isinglass River for a 12 month period. The highest withdrawal rate was 31.569 cfs in April. The lowest withdrawal rate was 3.192 in July.

Watershed Transfer - City of Dover

The City of Dover maintains the only registered water withdrawal (>20,000 gallons per day) on the Isinglass River. Dover withdraws an average of 830,000 gallons of water per day from the Isinglass River from a point just downstream of the Rochester Neck Road Bridge in the City of Rochester. The water is pumped to a recharge well in Dover (which recharges groundwater to the Cocheco) and serves as public water supply. [Source: Isinglass River A Report to the General Court, January 2002]

The NHDES report *Isinglass Annual Water Use Versus Stream Flow-2004*, reports that the City of Dover withdrew an average of 2.95 cubic feet per second from the Isinglass River for the months of January-June and October-December. The highest withdrawal rates were 3.342 cfs in the months of Jan-March and May. The lowest withdrawal rate was 1.186 in October, with no withdrawals in the months of July-September.

Channel Alteration – Farmington

The flood control project in Farmington was performed in two stages: from Central Street to South Main Street in 1956 and then in 1959 from South Main Street downstream for a total of 7,800 feet. Repairs were completed in 1964. The project included dredging and straightening the channel and constructing levees on the Cocheco River to alleviate flooding in the downtown area of Farmington. [Source: *The Work of the U.S. Army Corps of Engineers in New Hampshire, 1989, PL-662*, U.S. Army Corps of Engineers, New England]

(g) Open Space

Briefly describe, give the location and identify the type (e.g., floodplain, forested, etc.) and type of ownership (i.e., public or private) of significant areas of open space in the river corridor. Describe and include the location of any protected land parcels within the river corridor (e.g., state parks and forests, national forest lands, municipal parks and conservation easements).

Refer to Figure 5 Land Use Map and Table 21 below for illustrations and a listing of Land Use by type.

Table 21. Land Uses By Type In the Cocheco River Corridor

Land Use Type	Acres
Agriculture	421.3
Forested	4,657.7
Idle/Other Open	640.2
Industrial/Commercial	651.4
Mixed Use	149.9
Residential	1,342.6
Transportation/Roads	278.0
Recreation Fields/Recreation	266.1
Water	440.2
Wetlands	670.6
Wastewater/Sewage Treatment	180.4
Total	9,698.4

[Source: Land Use Summarized from available aerial photography based upon a standardized set of land use codes from GRANIT].

Unprotected Lands Currently Open Space and/or Undeveloped

From the headwaters area in New Durham to the Spring Street crossing in Farmington, the predominant land use type is Forested and Open Wetlands in New Durham and Farmington with small isolated patches of Agriculture in New Durham near a tributary of Hayes Brook. This segment contains a portion of the Cocheco Headwaters Core Focus Area and Supporting Landscape.

South of Spring Street through the urbanized town center of Farmington to NH Route 75, there are only sparse open lands. This segment of the river's riparian corridor is highly developed and the river channel itself has been altered (straightened and levees constructed by the U.S. Army Corps of Engineers).

From NH Route 75 to NH Route 16 in Rochester, the river corridor has isolated areas of dense Residential development, Industrial/Commercial development and large interspersed areas of Forested, Open Wetlands and Idle lands. The most developed areas of the river corridor in this segment are closest to NH Route 11. This segment contains a portion the Rochester Heath Bog Core Focus Area and Supporting Landscape.

From NH Route 16 and through the downtown area of Rochester to NH Route 125, there are large blocks of forested lands within the river's floodplain, particularly at its confluence with the Isinglass River and where the channel bifurcates (or becomes braided with multiple active channels). The City owns several large parks and parcels within the river corridor including Hanson Pines Park, the Ferguson Property, and Pickering Ponds which have mostly forested or vegetated riparian areas along the river. Also, the City continues to work on planning the Riverwalk Project, which will potentially include plantings and enhancement of riparian areas along the river.

From NH Route 125 to areas south of NH Route 16 to just north of downtown Dover, the river channel is highly sinuous within its floodplain. This segment is characterized by large Forested and Agricultural areas, including the Strafford County Farm, punctuated by isolated areas of Industrial/Commercial

development. This segment contains a portion of the Rochester Neck Core Focus Area and Supporting Landscape.

Through downtown Dover to the tidal limit at Cocheco Falls Dam the river corridor is highly developed. The City does own several large waterfront parks that are developed for passive and active recreational purposes and the Cocheco Riverwalk provides access and views to the river corridor.

Protected Lands

There are 524 acres of protected land in the river corridor and 5,909 acres of protected land in the watershed, a combination of privately owned and publicly owned properties, and easements held by non-profit organizations.

Table 22. Conservation Lands In the Cocheco River Corridor

Property Name	Location/ Agency	Protect. Level	Protect. Type	Primary Agency	Agency Type	Access Permitted	Acres
Abbotts Grant – Farmington Town Forest	Farmington	1	Fee Ownership	Farmington	Municipal	Unknown	53.8
Well Area	Farmington	2A	Fee Ownership	Farmington	Municipal	Unknown	18.8
Jennings Forest	SPNHF	1	Fee Ownership	SPNHF	Non-Profit/Land Conservation	Allowed	76.8
Town Forest	Middleton	2	Fee Ownership	Middleton	Municipal	Allowed	1.9
Hanson Pines	Rochester	1	Fee Ownership	Rochester	Municipal	Allowed	30.4
Gonic School City Forest	Rochester	2	Fee Ownership	Rochester	Municipal	Unknown	10.5
Gabriel	Dover	1	Conservation Easement	Dover	Municipal	Allowed	94.8
UNH – Milne Lot	UNH	2	Fee Ownership	UNH	Academic Inst.	Unknown	2.2
Hoppers Well	Dover	NA	Fee Ownership	Dover	Municipal	Unknown	11.9
Strafford County Farm	SPNHF	1	Conservation Easement	SPNHF	Land Trust	Allowed	139.9
County Farm Road	Dover	1	Fee Ownership	Dover	Municipal	Allowed	4.3
Myles Easement	SRC	9	Conservation Easement	SRC	Land Trust	Unknown	21.4
Tolend & Glen Hill Roads	Dover	1	Fee Ownership	Dover	Municipal	Allowed	22.9
Towle Easement	SRC	9	Conservation Easement	SRC	Land Trust	Unknown	17.3
The Willows	Dover	1	Conservation Easement	Dover	Municipal	Allowed	5.0
Bellamy Reservoir	Portsmouth	2A	FE	Portsmouth	Municipal	Unknown	9.4
Total							524

[Source: Conservation/Public Land taken from the archives of NH GRANIT; database last updated December 2007]

SPNHF – Society for Protection of New Hampshire's Forests

UNH – University of New Hampshire

SRC - Strafford Rivers Conservancy

2. Managed Resources

(a) Impoundments

List all of the dams which are present in the river, including any dams which are breached or in ruins. Identify their location, ownership, and purpose (i.e., flood control, low flow augmentation, or storage). Also indicate whether minimum flow requirements exist at any of the impoundments, if known. Include any proposals for new or reconstructed dams; indicate that this is a proposed dam by placing and asterisk (*) next to the name of the dam. Do not include existing or proposed dams which are used for hydroelectric energy production. These will be listed separately in the managed resources category.

Table 23. Impoundments on the Cocheco River

Code	Name of Dam	Location	Ownership	Status	Purpose	Material	Impoundment	Height	Drainage Area
67.03	Sterling Dam	Dover	NH Water Resources Council	Ruins	--	Timber/Stone	1.1	20	171.9
67.01	Hussey Mill Dam	Dover	<i>Removed in 1953</i>	Ruins	--	Concrete	14.5	14	160
204.01	Mill Pond Dam	Rochester	Mill River Trust	Active	R	Concrete	4	25	80
204.02	Gonic Dam (breached)	Rochester	Gosport Properties LLC	Active	R	Concrete	18	15.5	78
204.03	Cocheco River Dam	Rochester		Breached	NM	Timber/Stone	0	8	0
204.05	City Dam 1	Rochester	City of Rochester	Active	R	Concrete	50	14	64
83.04	Cocheco Dam 1	Farmington	New Dam LLC	Breached	(R)	(Concrete)	(4)	(12)	(13.5)
83.05	Cocheco Dam 2	Farmington	Mr. Wesley Rousseau	Breached	R	Concrete	0	7.6	13
83.09	Cocheco River Dam	Farmington	Coastal Materials Inc.	Breached/Ruins	R		---	---	---
170.23	Meyer Wildlife Pond	New Durham	Mr. James Meyer	Active	R	Earth	1.2	11	0.14
170.24	Taussig Wildlife Pond Dam	New Durham	Ms. Ann J. Taussig	Active	R	Earth	1.5	4	0.01

[Source: NH Dam Listing provided by NHDES, 2007]

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Submitted May 29, 2008

Addenda July 23; August 19; October 1, 2008

R = Recreation NM = Non Menace

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(b) Water Withdrawals and Discharges

(1) List any significant water withdrawals from the river, including withdrawals for public drinking water, industry, and agriculture. Identify the purpose (e.g., irrigation) and location of the withdrawal. Indicate if the river has been identified in a state, regional, or local study as a potential source of water supply and, if so, identify the study.

Table 24. Withdrawals from the Cocheco River [Source: NHDES 2008].

Withdrawal	Purpose	Location	Activity Status
Dover			
Cocheco Falls Association	Power Hydroelectric	Main & Central Ave.	Active
Dover Water Department	Water Supplier	Roosevelt Ave.	Active
Watson Associates	Power Hydroelectric	Watson Road	Active
Farmington			
Aggregate Industries	Mining	NH Route 11	Transfer Water
Farmington Country Club	Irrigation	NH Route 153	Annual Irrigation
Farmington Water Works	Water Supplier	Baldwin Way	Active
Farmington WWTF	Sewage Treatment	Baldwin Way	Annual Irrigation
Pike Industries, Inc.	Mining	NH Route 11	Active
Rochester			
City Concrete Company	Industrial	Chestnut Hill Road	Active
Frisbee Memorial Hospital	Institutional	11 Whitehall Road	Active
Pike Industries, Inc.	Mining	Rochester Neck Road	Active
Rochester WWTF	Sewage Treatment	Maple Street	Annual Irrigation
Woodsville/Rochester Hydr.	Power Hydroelectric	Main Street	Active
From Major Tributaries to Cocheco River (Interbasin Transfer)			
City of Dover	Recharge for Well Site - Drinking Water Supply	Isinglass River, Strafford	Active
City of Rochester	Drinking Water Supply	Berry River, Farmington	Active

(2) List all known surface water and potential discharges to the river and identify the source, type (e.g., industrial wastewater) and location of the discharge. Indicate whether the discharge has been permitted by the state (yes or no).

Table 25. Discharges to the Cocheco River [Source: NHDES 2008].

Point Source Discharge	Type	Location	Permit
Farmington Wastewater Treatment Plant	Wastewater	Farmington	NH0100854
Rochester Wastewater Treatment Plant	Wastewater	Rochester	NH0100668
Thompson KW Tool Co.	Industrial	Farmington Road, Farmington	
Dover Water Treatment Plant	Wastewater	Dover	NHG640003
Return to Environment			
Liberty Mutual Group	Commercial Business	100 Liberty Way, Dover	
Brox Paving Materials Inc.	Mining	Rochester Neck Road, Rochester	
Lydall Rochester	Industrial	134 Chestnut Hill Road, Rochester	
Waste Management	Industrial (irrigation for dust control on roads)	Rochester Neck Road, Rochester	

There has been a general improvement in water quality in the fresh and tidal waters in Dover and the rest of the Piscataqua watershed since the late 1980's. In large part this is due to the improvements to sewage treatment facilities, including the Strafford County facility in 1992 that ceased discharge into the Cocheco-Dover MP. In 2001, the City of Rochester performed substantial upgrades to the Rochester Waste Water Treatment Plant which improved the quality of waters discharged from the facility to the Cocheco River.

Two landfills, the Farmington landfill and the Cardinal landfill (private) are located between two tributaries of the Cocheco River, Pokamoonshine Brook and Rattlesnake River in Farmington.

Water quality monitoring of *E.coli* reveal three potential problem areas along the Cocheco River's mainstem at the following sampling sites:

- 1) Central Street Bridge (Route 75) in Farmington;
- 2) Cocheco Road (formerly Watson Corners Road Bridge) in Farmington; and
- 3) Route 125 Bridge in Rochester

(c) Hydroelectric Resources

List all known existing or potential (as cited in the NH River Protection and Energy Development Project -- Final Report; New England Rivers Center, 1983) sites of hydroelectric power production. Record the owner, location and whether the site is regulated or exempt from regulation by the Federal Energy Regulatory Commission (FERC).

Table 26. Hydroelectric Resources of the Cocheco River

Hydroelectric Facility	Ownership	Location	FERC License #
Cocheco Falls, Central Ave Dam	Southern NH Hydroelectric	Dover	4718
Watson Waldron Dam	NH Water Resources Council	Dover	6240
Hatfield Dam	Woodsville Rochester Hydro Association	Rochester	5563
Gonic Saw Mill Dam	Breached	Gonic	Breached
Cocheco River Dam	GLM Inc.	Farmington	Breached
Cocheco River PSC Dam	PSNH	Farmington	Breached

[Source: NH Dam Listing provided by NHDES, 2007]

3. Cultural Resources

(a) Historical and Archaeological Resources

Describe any significant historical or archaeological resources or sites with significant potential for such resources (as determined by the state historic preservation officer) found in the river or river corridor. Identify whether the resource is listed or is eligible to be listed as a National Historic Landmark (NHL) or on the National Register of Historic Places (NRHP) or is a recognized Historic District (HD) or Multiple Use Area (MUA). If known, indicate whether these resources are significant at a national, regional (New England), state, or local level. Below this listing, note any local town histories, oral histories, or general historical knowledge about the use of the river and its corridor.

Table 27. Historical and Archaeological Resources

Historical/Archaeological Resource	Listing/ Eligibility	Location	Community
Strafford County Farm	NRHP	County Farm Road	Dover
County Farm Bridge (destroyed by fire; abutments remain)	NRHP	Northwest on County Farm Road	Dover
William Hale House	NRHP	5 Hale Street	Dover
St. Thomas Episcopal Church	NRHP	5 Hale Street	Dover
U.S. Post Office (Dover Main)	NRHP	133-137 Washington Street	Dover
Public Market	NRHP	93 Washington Street	Dover
Michael Reade House	NRHP	43 Main Street	Dover
Sawyer Building	NRHP	4-6 Portland Street	Dover
Rochester Commercial and Industrial District	NRHP	North Main, Hanson and South Main Streets and Central Square	Rochester

[Source: National Register of Historic Places]

Refer to Figure 12 Recreational and Historical Resources for additional information.

Local Town Histories, Oral Histories or General Historical Knowledge

Cocheco River Watershed: An Historical Perspective

By Reuben Hall, Jr., P.E. for the Cocheco River Watershed Coalition (November 1997)

This summary is excerpted from a script for slide presentation. A video of the presentation is kept at the Rochester Historical Society. The narrative was also published in installments in the Rochester Times weekly newspaper.

Pre-European Settlement History

The word Cocheco means “rapidly foaming water” in the language of the Cocheco and Piscataqua Indians. Cocheco was the early Indian name for the falls at Dover, but early European settlers later extended the name to the whole river.

Aboriginal populations moved northward about 10,000 years ago as the glaciers retreated, inhabiting the Cocheco River basin about 3,000 to 5,000 years ago. In search of large game species, many groups set up nomadic camp sites by the river falls to take advantage of fishing (salmon, shad, alewife, lamprey) and convenient transport by canoe. Another factor for settlement was near the river where the outcroppings of quartz and felsite along its banks. These early hunters and gatherers quarried these rocks for use in tool making.

Early European Settlement

Edward Hilton settled at Dover Point in 1623, which has been occupied to the present day, making Dover the oldest continuous settlement in the state. These first European settlers came to Dover mainly for economic reasons as the Cocheco River was the best fishing in the region. From the period of

1616-1619 the native Indian population in New Hampshire, which lived in isolation for 200 generations, was decimated by diseases carried by the European fishermen and traders to the region.

By 1636, the Wheelwright deed was executed between the confederacy of the Penacook tribes and the colonists, which included land, fishing and hunting rights about 12 miles up the Cocheco River. By 1644, Dover Point settlers moved up the river to set up a sawmill at the lower falls establishing the village of "Cochecho" which is now downtown Dover. The Broad Arrow Acts of 1691 and 1729 established that all pines greater than twenty-five inches in diameter were the property of the King of England. As sawmills and masting roads were constructed along the river, pine and oak timbers were harvested from throughout the Cocheco River basin. By 1792, the lumber industry began cutting deep into interior forests upriver which resulted in sudden change in wildlife habitat conditions. Elk and caribou disappeared from the region as forest clearing intensified, while deer and wolf populations expanded.

In 1722, Rochester was incorporated by royal charter and, in 1730, its territories were extended further up the Cocheco basin to include Norway Plain, Farmington, Milton, and Milton Mills (later incorporated in 1789 and 1802). In the first two centuries of settlement, the Cocheco basin became a landscape of crop fields and livestock pastures.

To transport farm, livestock and industrial goods, the shipbuilding trade developed a boat called a gundalow designed to navigate shallow waters and strong currents. The gundalow was pivotal to the region's early commercial shipping success, including supply of brick for construction in Boston. By 1800, over a dozen brickyards lined the Cocheco waterfront, firing kilns with 30,000 tons annually for cordwood delivered by the gundalows. However, the Cocheco basin remained largely a rural landscape from headwater to tidewater.

19th Century

At the opening of the 19th century, there were three principal industries along the Cocheco – agriculture, lumbering and fishing. With the opening of the industrial revolution, the once rural landscape of the Cocheco basin began a period of rapid change. Land clearing accelerated as farms grew to commercial size to feed the growing populations in the manufacturing centers at Rochester and Dover. The small mills and cottage industries gradually were replaced by large mill complexes along the Cocheco in Dover and Rochester. In 1841, the first steam train serviced Dover and by 1851, the Cocheco Railroad to Alton was completed, and reached all towns in the basin except Strafford and Middleton. With the railroads, commercial production of lumber increased for export from Dover to the West Indies. By this time, the Cocheco basin had become a manufacturing center of the region when the abundant water power of the river was harnessed to produce cloth and clothing, printing, woolens, wood products, iron castings, leather goods, bricks and machinery. Shoemaking was a primary industry throughout many towns in the region. Farming and agriculture decreased as many farmers moved west in search of more productive and profitable lands and populations shifted toward urban centers.

20th Century

Several events triggered major changes on the river in the 20th century. With the damage from the 1896 flood, the introduction of the automobile, and the use of steam power for industry, the Cocheco River was no longer a focus for transportation, power and commercial business. By 1910, farming continued to decline, and as reforestation increased, second growth forests became a viable source of timber. From the 1920's through the 1940's, the giant textile mills moved out of the region, followed by the tanneries and other industries. These large scale industries had two lasting effects on the Cocheco River. Use of water-power by manufacturing processes affected the quantity of the river's flow. The large mills controlled their dams for their own use. By-products from these industries affected the quality of the river water. Dye from print works, tannins from the tanneries, and sewage from open pipes were commonly discharged directly into the river.

During the Depression forest industries declined, but since World War II, suburbanization of the region has been almost continuous, bringing with it widespread deforestation and new sources of pollution and environmental alteration. The Clean Water Act of the 1970's and subsequent amendments have drastically improved water quality throughout the river basin. Modernization of wastewater treatment plants in Farmington, Rochester and Dover, and the adoption of environmental regulations for wetlands and streams, and changes in agricultural practices have all contributed to this improvement. A fish ladder was also installed in the early 1970's at Cocheco Falls dam in Dover to reestablish anadromous fish species that were prominent hundreds of years ago in the watershed.

History of the Cocheco Mill Industry

This summary is drawn from a variety of sources, including those listed here.

[Sources: *Landmarks in Ancient Dover, N.H.* Mary P. Thompson 1892, reprint 1965;

http://www.dover.lib.nh.us/DoverHistory/mill_history.htm, *The History of New Durham, New Hampshire* by Ellen Cloutman Jennings, 1962; *The Dover Manufacturing Company and Integration of English and American Calico Printing; Techniques, 1825-29* by Carolyn Sloat in Winterthur Portfolio #10, 1975]

The Cocheco River played an important role in the American industrial revolution. The river powered early development of the great mills at the Cocheco Falls at Dover Landing, the head of tide of the Cocheco River. This was not, however the first use of water power of the river. The energy created by water flowing over the falls created by drops in elevation of the land, 750 feet from headwaters to tidewaters, was harnessed soon after settlement began at Dover Point. Farmers built sawmills for the lumber to build their homes, barns, and meetinghouses. They built grist mills to grind their grains.

In the seventeenth century, Richard Waldron was granted the mill privilege to build a sawmill at the Cocheco Falls in 1642, followed by another grant for one on the other side of the falls in 1648. After settlers harvested timber, they converted the land to agriculture, moving upstream to more forests for timber. The need for mills moved upstream with the settlers.

At the beginning of the eighteenth century Waldron's son built a sawmill at the Tole End Falls (Whitcher's, now Whittier Falls). Upstream at the third falls, another mill privilege was granted for a sawmill and planing mill with dam height constraints to protect the water flow downstream. The mills served local farmers' needs as well as making lumber for export to build the King's Navy. Settlers constructed and operated grist and sawmills all the way up the Cocheco to its headwaters as lands opened up throughout the century. During those years fulling mills were added to the mill capabilities. Clothiers carded and fulled woolen textiles woven domestically in a family or proto-industrial system of production.

As the nineteenth century began, industrial manufacturing of textiles was in its infancy in New England. The English manufacturers were producing high quality textiles and protecting their industries from American competition. At the same time American independence brought entrepreneurship and technical advances in manufacturing. The first cotton mill in the region, the Dover Cotton Factory Company, was developed at Kimball's Falls (Upper Factory Falls) and opened in 1815. At first cotton yarn for weaving was produced, then grey goods, plain weave unbleached cotton. A mill village known as Williamsville housed the workers, mostly young farmers' daughters. The conversion to industrial manufacturing was not yet at hand and fulling, grist and sawmills were built in Gonic, Rochester, Farmington, Middleton and New Durham.

By 1825, the Dover Cotton Factory Company had begun to move its operations downstream to the Cocheco Falls. Other factories grew up around the tidal basin at the foot of the falls to support the growing textile industry. With substantial funding from investors in Boston, the name changed to Cocheco Manufacturing Company and large scale production began. After years of struggling to meet quality standards to compete with the English and French manufacturers, the mills produced millions of yards per year of high quality printed cotton yardage that was marketed from Boston and sold throughout the United States and overseas.

At mid-nineteenth century, the mill owners bought up mill privileges and land for dams and mill ponds throughout the watershed to control the water supply for the mills. More energy was needed than the river could supply, so they converted to steam power. Shipping in coal by ship was inefficient. The trains arrived in the 1840s brought in coal and raw cotton and took out the manufactured products. Meanwhile large woolen mills operated in Gonic and Rochester. Industrial shoe factories operated in Farmington and Rochester. Two large grist mills continued to operate in Rochester. The end of domestic manufacture came gradually even as the huge mills prospered.

By the twentieth century the large manufacturers were consolidating in Lawrence, Massachusetts. The mills on the Cocheco were in decline and by mid-century, they were in disrepair. Then two visionaries, Joe Sawtelle and Tim Pearson, bought the complex at Cocheco Falls, restored the structures and rehabilitated interior spaces for adaptive reuse. Factories in Rochester and Farmington have been similarly treated.

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Twenty-first century canoeists and kayakers can see granite work along the river banks, remains of the small mills and dams. In the urban centers of Rochester and Dover, riverwalks celebrate the industry the river supported.

Social History of the Strafford County Farm

In 1866 and 1867 Strafford County purchased the Snell and Trickey farms in rural Dover to establish the Strafford County Farm. The endeavor was to create a self-sufficient farm to reduce the cost to the county of supporting paupers and the insane. Fires occurred in both the Almshouse (1893) and the Insane Asylum (1891). A monument honors the people who died in those fires. As a result of the tragedy, a new almshouse was built and the State of New Hampshire assumed the care of the insane. Over time attitudes and responsibilities have changed. The institutional uses of the County Farm have changed, too. Modern facilities, enlightened public policy, and professional standards are now used to provide care for and services to Strafford County residents. The Cocheco River flows 10,000 feet around the perimeter of the land. A conservation easement protects the river resources as well as the land.

[Source: This summary was excerpted from *Strafford County Home: The History of Commitment to the Elderly* by Darlene E. Smith, New Hampshire Technical Institute, 1990.]

City of Dover

The City of Dover is the oldest continuous settlement in New Hampshire and the seventh oldest in the nation. The city is situated between the Cocheco and Bellamy Rivers, whose resources local residents and businesses have always used to their personal and economic advantage. The Woodman Institute Museum in Dover contains documentation of the historical use, natural history, antique and historical objects and documents of the river. Heritage Walking Tours organized by the Greater Dover Chamber of Commerce include a tour along the river of the Old Mill and Waterfront.

City of Rochester

Rochester was settled by farmers, but manufacturing companies established factories along the Cocheco River in the urban center of the city. The remaining mills have been adapted for residential and community use. They are still lighted and heated by hydropower from the Cocheco River at Wyandotte Falls. The Victorian Fairgrounds at Cold Springs is situated on the terrace above the river. It overlooks the floodplain forest. Across the river Snow's Intervale, a Victorian promenade, stands ready for restoration and with trails to the river. Upstream at Hanson Pines the Riverwalk group intends to restore and enhance walking trails through the sixteen acre park. It was donated to the City by Dominicus Hanson with the proviso that if the pines were cut down, the ownership would go to a Protestant church in Nashua and he expected his Catholic friends in Rochester to see that that did not happen.

Town of Farmington

Incorporated 1798, the town started as West Parish, a portion of Rochester that included several large farms. Those farms were separated from Rochester in 1798 as Farmington, a reference to the area's fertile farmland. It was also known as Farmington Dock because its location on the Cocheco River was an ideal spot for sawmills. Those sawmills expanded into shoe-making factories, one of the first places to use automated shoe-making machines instead of handwork. One Farmington resident known in the shoe trade was Jeremiah J. Colbath, who, after changing his name to Henry Wilson, was elected Vice-President under Ulysses S. Grant. [Source: Report-Economic & Labor Market Information Bureau, NH Employment Security, 2007. Community Response 09/27/07]

Town of New Durham

The Old Bay Road through Farmington and New Durham was the original route from the Seacoast to the Lakes Region. At the top of the watershed farmers from Durham, Newmarket, and Greenland settled on farm and forestland granted by proprietors in Portsmouth after mid-eighteenth century. Some of the lakes and ponds were once millponds for the early sawmills and grist mills. Marilla Ricker, a lawyer and suffragette who ran for NH governor before she had the right to vote, was born here. Free Will Baptists met and worshipped here in the founding days of the sect.

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Table 28. Locally important historical structures, locations, views, and lands; culturally significant lands, places and event locations; and recreational areas

Name	Natural	Cultural	Community	Description	Source
Sixth Street Corridor Bike Path	N	Y	Dover	Recreation use along greenway. Scenic access along Cocheco River	Master Plan and City Planning Staff
Saw Mill Dam Area	Y	Y	Rochester	Potential for canoe access to River and possible riverwalk to adjacent City land	Planning Board member
Hodgdon Park	Y	Y	Rochester	Small park along a scenic Axe Handle Brook	Planning Board member
Snow's Intervale	Y	Y	Rochester	Historic recreation site along River in downtown district	Historical Society member
Farmington Levee	Y	Y	Farmington	Levee constructed in the 1950's by the U.S. Army Corps of Engineers to protect downtown from flooding. Scenic walking area.	Town Administrator
Main Street School	N	Y	Farmington	School is now occupied by the Farmington Municipal Offices	Planning Board, Zoning Board, Town Administrator
Waldron Canal	Y	Y	Farmington	Former site of a hydroelectric generation facility. Scenic area directly adjacent to the town forest.	Planning Board member
Dams on Cocheco River	Y	Y	Farmington	Historically used for ice cutting. Wildlife habitat area	Planning Board member

[Source: NH DES Local Resource Protection Program]

(b) Community Resources

Briefly describe how the river is recognized or used as a significant community resource. If the river's importance is recognized in any official town documents, such as a master plan, include reference to such documents.

MASTER PLAN LANGUAGE IN SUPPORT OF THE COCHECO RIVER

TOWN OF NEW DURHAM

2.6 Land Use

Policy Standards:

4. Protection Areas and (Implementation Zoning Districts)
 - a. Resource Protection Areas (New Resource Protection Overlay Zoning District)
 - ii. Desired Uses - Only activities that do not adversely impact the ecological or natural resource value of these areas will be allowed.
 - iii. Land Use Guidelines - Low intensity recreational, wildlife management and forestry uses are suitable as long as natural resource qualities are not diminished. New subdivision and site development or use of the land will be restricted. Naturally vegetated upland areas will be maintained adjacent to the wetlands and surface waters consistent with shorefront protection policies.
 - b. Shorefront Protection Areas (Existing Shorefront Conservation Overlay Zoning District). Shorefront Protection Areas have important natural resource values and function as transition areas between ecologically sensitive resource areas and areas more suitable for human activity.
 - ii. Desired Uses - The shorefront conservation area is primarily intended to control how the land is used, rather than to specify land use. Therefore, a wide range of uses can be appropriate and include low intensity recreational, agricultural and forestry practices with defined performance standards. Residential uses may also be allowed provided natural resource qualities are not diminished.

3.0 Town Appearance and Character Policies and Implementation Strategies

Policy Principles

General:

3. The scenic quality of the Town along the lakefront, wetlands, rivers, main roads, and in areas with outstanding scenic beauty will be protected.

TOWN OF FARMINGTON

Chapter 1 – Goals and Objectives

Natural Resources

Goal: Identify and critically analyze the natural resources of Farmington in order to identify the environmental assets of the community and level of protection that they require.

Objective: Continue to strictly enforce the Shoreland Protection Overlay District to protect the quality of water resources not covered by the RSA 483-B by helping prevent non-point source pollution, using appropriate setbacks from rivers, streams, and other waterbodies, and by ensuring an appropriate vegetated buffer.

Goal: Create and maintain a set of ordinances that preserve and enhance the important natural resources of Farmington, while providing for their use.

Objective: Continue to upgrade the Excavation Ordinance that expands the requirements of RSA 155-E in order to protect the community from impacts of excavation activities, particularly when conducted near rivers and roads and to ensure that excavation does not harm the environment or present a public safety hazard.

Objective: Revise as appropriate, the zoning ordinance, site plan review and subdivision regulations to ensure the minimization of development impacts on important natural resources, such as wetlands, rivers, steep slopes, farmland soils, etc.

Chapter 3 – Natural Resources

Open Space and Recreational Land

Recreational properties and waterbodies provide important sources of outdoor enjoyment for people of all ages.

Floodplain

Areas susceptible to flooding present obvious hazards to life and property, and the continued protection of these areas from development is an important responsibility. Farmington is somewhat unique in that a large area of former floodplain in the downtown is protected by a dike built in the late 1950s to protect the downtown from such catastrophic events as the 1936 flood. The town must take steps to ensure that the integrity of the dike is not compromised and that it will continue to protect this area of development that relies on the maintenance of the dike. Farmington should encourage uses of the floodplain that are least affected by and have the least effect on the floodplain.

Stratified Drift and Bedrock Aquifers

The Town of Farmington has designated an aquifer protection overlay zone delineating the 180 Day Zone of Contribution to public drinking water supply wells. These areas are particularly sensitive to certain types of activities that may threaten to contaminate the aquifer. Because this resource is vital to the town's and individual resident's drinking water supply, continued protection of the aquifer should continue. Much of the stratified drift aquifer is located within the Cocheco River basin and floodplain.

Point and Non-Point Pollution Sources That May Threaten Water Quality

Farmington has a number of potential non-point pollution sources that are identified on the map entitled, "*Town of Farmington: Potential Nonpoint Pollution Sources, Aquifers*". This map is hereby incorporated into this master plan. A large number of the potential sources in Farmington are sand and gravel mines in close proximity to the Cocheco River and over the known stratified drift aquifer also depicted on the town's zoning map.

Chapter 6 – Future Land Use

Potential Growth Areas and Areas having Development Constraints

Included as part of this chapter are two maps, both entitled "*Farmington, NH: Future Land Use Constraint Layers*". The maps depict areas where one or more constraints to growth are experienced in Farmington. These constraints include the location of wetlands, steep slopes, over 0.25 miles from a road, location of the aquifer, location of the floodplain, and location of developed land. The maps are not intended as a regulatory tool, but as a guide to assist the planning board and the members of the public in determining which areas may be important to encourage growth and which areas may benefit from more stringent regulation in order to protect a valuable resource or feature.

CITY OF ROCHESTER

Land Use

Goal 3

Objective #2: Preserve fragile natural resources including ponds, streams and rivers, wetlands, flood plains, steep slopes and rock outcrops, prime agricultural lands, valuable woodlands, unusual stands of trees, individual specimen trees, and wildlife habitats.

Objective 3: Protect the quality of Rochester's existing and potential drinking water supplies through aggressive management of the use of land and activities that could impair these resources.

Natural Resources Geology

Along the Cocheco River stratified drift deposits are found as well as alluvial deposits (floodplain deposits). The stratified drift is composed of fine sands and gravel, which provide suitable sources for drinking water supplies.

New Hampshire Natural Heritage Inventory lists:

Water Resources

Along the major river systems, there are significant recharge sites for ground water (aquifers) and numerous small ponds. Regulatory measures such as minimum shoreline set backs and conservation

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districts can help preserve these resources. Some members of the Land Use Committee stated that the quality and quantity of groundwater and surface water was one of the biggest concerns in the city.

Rivers and Streams

The Cocheco River is a Class B river and considered acceptable for fishing, swimming and other recreational purposes and for water supply after adequate treatment. The Cocheco River is located in the western portion of the city. It flows nearly through the center of the City from the boundary with Farmington to the Dover City boundary. The Cocheco River drainage area covers about 33.5 square miles in Rochester. The Cocheco River Watershed Coalition has nine monitoring sites and investigates potential threats to the three tributaries of the Cocheco River through stream walk surveys and water quality sampling. The Land Use Committee survey identified the Cocheco River as a Community Cornerstone. The Community Survey rated the quality of rivers as very important.

Floodplains

Rochester's 100-year flood boundaries are mainly associated with the Cocheco, Salmon Falls and Isinglass Rivers. The City's zoning ordinance regulates activities in the floodplain area. The City plans to evaluate extending sewer lines to an existing mobile home park built over sandy soils next to the Cocheco River.

2003 The Plan for Downtown Rochester

One of the goals recommends more numerous visual and pedestrian connections to the Cocheco River, so that residents and visitors have opportunities to see and enjoy the changing scenery and dramatic drop of the river as it passes through. It suggests that the riverfront walkways and park corridor should be expanded over time. A walkway and viewpoint might be constructed to view the falls and the canal-like stretch along the historic mill edge. Perhaps a pedestrian bridge can eventually be created, reaching across the river and connecting to trails and bikeways that lead to adjacent neighborhoods and along the green corridor that flanks the Cocheco as it flows southward

CITY OF DOVER

Natural Resources

Soils

Wetland (Hydric) Soils

Wetland soils are associated with low lying areas in Dover, such as the Cocheco River floodplain. These areas are best suited to natural open space or limited development because wetland soils provide several natural functions that are beneficial to the community including: absorbing excess flood waters preventing downstream flooding; providing valuable habitat for fish and wildlife; providing groundwater recharge to local aquifers; and trapping sediment and other pollutants, thus acting as a surface water filter.

Seasonally Wet Soils

These soils are somewhat better drained than the wetland soils, but typically have a seasonal water table within 2 1/2 to 3 feet of the surface, a perched water table or slowly permeable sub-layer during the wet season. They are present on the lower slopes of hills and on low knolls associated with the Cocheco River and its tributaries. The City should encourage low density uses and those that are not likely to pollute the groundwater. Flooded basements and submerged leach fields can be expected.

Slopes

Areas with the steepest slopes tend to be associated with the stream and river valleys, especially along the Cocheco River between Watson Road and Whittier Street and also between the Upper Narrows and Fresh Creek.

Fish and Wildlife Resources

Finfish

River herring are anadromous fish that migrate up the Cocheco to spawn in fresh water via the fish ladder at the falls in downtown Dover. Since 1988 there has been a general increase in the migration of this

species as reported by the NH F&G,. The Atlantic salmon, once a very abundant species, is only found as a stocked species today. An Atlantic salmon fry stocking program was initiated in the late 1980's to produce a coastal recreational fishery, however, ended in 2003 in the Cocheco River as returns did not reach project goals. During the 1980's NH F&G stocked the Cocheco River with American shad. Since stocking was discontinued in 1988, the number of returning fish in the Cocheco has remained low. In recent years the striped bass has made a comeback and is now present throughout the Great Bay estuary and tributaries including the Cocheco River according to the NH Fish & Game Department.

Aquatic Habitat

The primary freshwater habitats in Dover are the Bellamy and Cocheco Rivers above the dams and Barbadoes and Willand Ponds. As reported in the 1988 Master Plan, the rivers support a warm water finfish population that includes: American eel, Lamprey eel, common white sucker, yellow perch, Eastern chain pickerel, Eastern brook trout, small-mouth bass and common shiner. The Cocheco is stocked at its upper reaches by the NHFGD for rainbow and brook trout.

Habitat Protection Plan

In 1997 the Great Bay Resource Protection Partnership prepared a Habitat Protection Plan for the Great Bay area that concentrated on protection and restoration of significant habitat for waterfowl and other migratory birds, fish and wildlife. This Partnership of several state and federal agencies and several environmental organizations evolved in response to the North American Waterfowl Management Plan. The Partnership identified over 14,000 acres of high value habitat in the Great Bay watershed (involving 24 communities) as candidates for further protection. In Dover there are over 6000 acres of significant habitat and associated lands in six different areas within the City that have been identified by the Partnership. Funding for the purchase of conservation easements, land in-fee and wetland restoration projects come from a variety of funding sources including federal, state and local governments, non-profit organizations and private fund raising. While efforts in the early years have focused on protecting properties near the Great Bay, lands along the five rivers that feed into bay, including the Bellamy and Cocheco Rivers in Dover, are also identified as important areas for protection and restoration efforts. Of the 25 total Significant Habitat Areas around the Great Bay, Dover has portions of five, totaling 6,655 acres or 36% of the land base in town. Lands within these areas contain high value habitats to be considered for protection, including: "Cocheco River / Blackwater Brook" and "Salmon Falls / Cocheco River" systems.

Rare Species/Exemplary Natural Communities

In Dover there are over 20 rare species of special concern and exemplary natural communities that have been listed by the NH Natural Heritage Inventory (NHI) under the Native Plant Protection Act of 1987 (NH RSA 217-A) and the New Hampshire Endangered Species Conservation Act of 1979 (NH RSA 212-A).

River Water Quality Water

Both the Bellamy and Cocheco Watersheds are particularly susceptible to water quality impacts from future development. Both of these have large areas of their watersheds outside the City and are subject to significant land use change beyond Dover's control. In recent years both the Cocheco and Bellamy Rivers have been sampled for various constituents to determine water quality levels. Sampling is conducted on an ongoing basis at several stations by the Great Bay Coast Watch. The NH Department of Environmental Services (NHDES) also conducts periodic sampling at a number of sites on both rivers. In addition, sites on the Cocheco and Salmon Falls were studied as part of a three-year investigation on storm events in tributaries to the Great Bay by University of New Hampshire's Jackson Lab.

Dam Sites

There are currently 52 dam sites in the City, although there are only five major dams. There are two on the Cocheco River—one at the Pacific Mills in downtown Dover and another at Watson Road and one on the Bellamy River at Sawyer Mills.

Open Space and Recreation

Lands of Interest. The Conservation Commission is interested in acquiring land or limiting development in certain areas for preservation purposes. Many of the areas which should be prioritized for protection are discussed above in the unprotected open space section. The Cocheco, Bellamy and Piscataqua/Salmon Falls Rivers are a natural focal point for an open space plan. The surface area of the water

provides an open space within the City as the rivers wind their way through the developed lands in Dover. The land adjacent to the river corridors provides an opportunity to create a linear open space system which assists in protecting water quality, provides access to water bodies where appropriate, and plays a role in downtown beautification projects. In addition, the rivers link several other communities to Dover and therefore provides an opportunity to address open space preservation at an inter-municipal level. Joint protection efforts among communities will help to protect drinking water supplies and important wildlife habitat.

Storm Water Management

Pollution Prevention/Good Housekeeping - Current Practices

The City utilizes two locations for snow dumping. One is located at Maglaras Park and the other is at the Dover Ice Arena. The snow melt water is not treated and eventually is discharged into the Cocheco River. Fire Protection and Emergency Management

Dover does not seem to have a potential emergency problem from flooding. The current zoning and the Federal National Flood Insurance Program appear to have controlled growth in these areas. Some concern has been raised about the flooding that has occurred along the upper part of the Cocheco River because of the use of flash boards at the Cocheco Falls and Watson-Waldron Road dams. These flashboards are supposed to be designed to give way under flood conditions, but it is not clear that the Cocheco Falls dam flashboards have this capability

Transportation

In order to move towards this vision, the City of Dover seeks to adopt policies, amend regulations, develop short and long-term plans and implement projects which individually and collectively promotes a transportation system that supports and encourages full revitalization and use of our waterfront with full access to recreational and transportation uses of the Cocheco River.

Watershed Restoration and Implementation Report

In 2004 an ecological inventory and assessment of Cocheco River watersheds was conducted by the Nature Conservancy, Audubon Society of NH and the NH Natural Heritage Bureau. The purpose of the inventory project was to document significant habitat for wildlife, plants, and natural communities of conservation concern in the Great Bay region. The inventory documented many areas supporting rare plant species, exemplary natural communities, wildlife species of conservation concern, and significant wildlife habitat. The Cocheco River contains a network of important tidal wetlands, remnant patches of riparian forests and open fields. It is rich in wetland resources. Although this community is considered exemplary, its condition has been degraded as a result of buffer loss, water quality degradation and invasive species. The area supports waterfowl, shorebirds and wading birds including the great blue heron, green-backed heron, greater yellowlegs, American black duck, green-winged teal, and wood duck.

Recreation

In 2004, the Dover City Council authorized the purchase of a former railroad bridge off Washington Street along with the surrounding tracks to make it a part of a future community trail to link a city-wide walking/bike path utilizing the abandoned B&M rail tracks which runs along the Cocheco River. On April 14, 2004, the Dover City Council created the Cocheco Waterfront Development Advisory Committee to review all aspects of redeveloping the City's River Street parcel and facilitate a plan for developing the parcel as an multi-faceted destination point, offering recreational, economic and quality of life opportunities for everyone.

4. Recreational Resources

(a) Fishery

Identify the type and location of any high quality recreational fisheries or areas with such potential which are present in the river (as determined by the NH Fish and Game Department). Also indicate areas that have potential to be significant fisheries.

Cocheco Road Bridge

The Cocheco Road Bridge in Farmington is a popular fishing and duck hunting spot on the river.

Locally Important Fisheries Habitat, Dover

The primary freshwater habitats in Dover are the Bellamy and Cocheco Rivers above the dams and Barbadoes and Willand Ponds. As reported in the 1988 Master Plan, the rivers support a warm water finfish population that includes: American eel, Lamprey white sucker, yellow perch, Eastern chain pickerel, Eastern brook trout, small-mouth bass and common shiner. The Cocheco is stocked at its upper reaches by the NHFGD for rainbow and brook trout. Willand Pond, that straddles the Dover/Somersworth border, supports a fish population that includes white perch, largemouth bass, and eastern chain pickerel. The fish ladder located at Cocheco Falls allows diadromous fish species to access freshwater sections of the Cocheco River that are critical to their survival, as well as, supplies a seasonal forage base for resident fish during the juvenile stage.

[Source: Dover Master Plan, Natural Resources Chapter, Aquatic Habitat and NH Fish and Game Department]

(b) Boating

Describe any significant recreational boating opportunities, which are present on the river, including whether it is used for motorized boating. Indicate if the river is cited as significant for recreational boating in a publication of a national, regional or statewide recreation organization. Refer to the NH River Protection and Energy Development Project to determine the river's significance as a recreational boating river. Also note if boaters are attracted from beyond the local area and if there are areas with potential to be significant boating resources.

[Source: Access Guide to the Cocheco River (2003) by Strafford County UNH Cooperative Extension and the Cocheco River Watershed Coalition]

Cocheco Road Bridge - Farmington

The first navigable reach of the river starts where the Cocheco Road crosses the river in Farmington and where there is a well-marked canoe launch. For 6.5 miles downstream the water level fluctuates with the season and varies from barely navigable in the dry months to swift current and rapids at high flow. There can be obstacles such as fallen trees and beaver dams amid the rural landscape and beautiful seasonal scenery.

Little Falls Road Bridge - Rochester

The public right of way along Little Falls Road in Rochester serves as a takeout for canoeing the upstream reach of the river beginning at the Cocheco Road Bridge in Farmington. This location also serves as the put-in for paddling upstream toward Farmington or downstream into Rochester. About 200 yards downstream from this access is Little Falls, which may require a short portage. From Little Falls it is an easy paddle downstream to Hanson Pines Park through the rural riparian backyards of Rochester.

Hanson Pines Park - Rochester

Also called Dominicus Hanson Park, this natural area reaches a half mile along the banks of the river in the heart of Rochester fringed by tall pines in this managed, mature forest. Long ago this section of the

river was channeled and dammed for the mills downstream. Recreational features include footpaths, picnic tables and benches throughout the park. A footbridge crossing the river to Dewey Street makes a fine vantage point for wildlife and scenic viewing. Alongside the bridge is a convenient location to put in a canoe or end a canoe trip upstream from Farmington or Little Falls.

Ironwood Park - Gonic

Ironwood Park in Gonic, a small wooded picnic area at the end of England Road on the north bank of the river, provides a good launch for a canoe or kayak. From this point is a scenic downstream paddle to the confluence of the Cocheco and Isinglass Rivers, and then on down the Cocheco River.

Cocheco River - Dover

The river through Dover provides for excellent flatwater canoeing and kayaking under varying landscapes. The upper section has five miles of largely undeveloped winding riverfront. The middle section flows through the heart of Dover with “backdoor” views of the city not visible elsewhere.

(c) Other Recreational Opportunities

Refer to Figure 12. Recreational and Historical Resources for additional information.

List of Recreational Resources in the River Corridor and Watershed

[Source: Access Guide to the Cocheco River (2003) by the Strafford County UNH Cooperative Extension and the Cocheco River Watershed Coalition]

Blue Job Mountain – Strafford, Rochester

The top of Blue Job Mountain in Strafford provides a spectacular view of the Cocheco River watershed and its headwaters. This popular hiking area contains wild blueberry fields, spruce-fir forest and a migratory flying for many bird species.

Abbott's Grant - Farmington

The Farmington Town Forest is a 50 acre natural preserve along the Cocheco River above the Waldron Mill Pond. The riparian forest and associated pristine wetlands were donated by Abbott and Arlene Lawrence for public enjoyment. The property has a trail system for walking or hiking and viewing wildlife.

River Walk in Downtown - Rochester

The river walkway behind the offices of Foster's Daily Democrat on River Street and Bridge Street in downtown Rochester is a wonderful place to walk, picnic, watch for fish and wildlife and learn about the history of Rochester. Many of the historic homes on River Street back onto the river. From Bridge Street to the Wyandotte Falls buildings, the falls are prominent and past the end of the buildings view the river downstream as it flows past the site of the historic box mill toward the fairgrounds. From the walkway the arches of the North Main Street Bridge are visible. The upper dam and the dam downstream of Bridge Street at Wyandotte Falls are relics of the manufacturing mills once powered by the river.

Axe Handle Brook - Rochester

A pocket park is located in Rochester on Axe Handle Brook. An historic marker, gravestones, a stone wall and a picnic table are set in mature woods along this tributary to the Cocheco River.

Henderson Farm – Rochester

This new property of the City of Rochester was acquired in conjunction with the well site for a new municipal water source. The intent is to use the former campground in the Cocheco River floodplain as a recreation site.

Pickering Ponds - Gonic

Pickering Ponds in Gonic has two miles of trails that follow the dikes around two historic settling ponds and loop down along the river. The dikes are a vantage point for wildlife viewing in and around the ponds and river. Wildflowers and other wildlife are abundant in this mix of habitat areas. This is a favorite birding spot for sighting gulls, waterfowl, shorebirds, songbirds and raptors. In the winter, this area is excellent for cross-country skiing. There is no permanent signage at this location, but a path leads to the entrance through a gate and there are several granite benches placed along the trail.

Strafford County Farm - Dover

The Cocheco River Trail at Strafford County Farm in rural Dover is an easy one-mile walking loop which descends a gradual hill near the site of the old covered bridge. The trail meanders along the ancient

floodplain of the river, through a forest and clearings which are rich in bird and beaver habitat, wildflowers, tall pines and scenic river vistas. Ascending from the floodplain, the trail passes an historic monument, into the forest among huge oak trees, and back across a field to the trailhead.

Cocheco Riverwalk - Dover

The Cocheco River is a central attraction in downtown Dover. A blue line on the sidewalk and informative plaques mark a trail. The trail winds through downtown, along the riverbank to the Chestnut Street Bridge, then back down to a pocket park by the falls at the mill and along the river through Henry Law Park to a covered footbridge.

Garrison Hill Tower - Dover

From the observation tower atop the 298 foot Garrison Hill, the Cocheco River Watershed is visible below. The river's course can be traced across the landscape, with sweeping views from the headwater hills in the west to the tidewaters, Great Bay Estuary and the Gulf of Maine, to the east.

Table 29. Other Recreational Resources in the River Corridor

Recreational Area	Community	Primary Use	Acres
Dover Junior High School	Dover	Park	4
Henry Law Park	Dover	Park	5
Immigrants Park	Dover	Park	0
Mineral Park	Dover	Field Sports	12
Beckwith Little League Park	Dover	Field Sports	10
Rochester Country Club	Rochester	Golf	150
Gonic School	Rochester	Field Sports	13
Riverside Softball Park	Rochester	Field Sports	7
Rochester Fairground	Rochester	Special Events Facility	37
Allen School	Rochester	Field Sports	14
Maple Street School	Rochester	Field Sports	2
Holy Rosary School	Rochester	Field Sports	2
Roger Allen Park	Rochester	Park	75
Happy Valley Camping Area Now the Henderson Property	Rochester	Campground	0
Farmington Country Club	Farmington	Golf	45
500 Boys Club Park	Farmington	Field Sports	5
Fernald Park	Farmington	Field Sports	4
Memorial Park	Farmington	Park	2
Memorial Drive School	Farmington	Field Sports	15
Beaver Pond Campground	Farmington	Campground	40
	New Durham		
Total			

[Source: Sites identified by the NH Office of Energy and Planning]

City of Dover Waterfront Parks

Fish Ladder Park - 0.1 acres - Mini Park

This small, linear park, located in the center of downtown Dover, is adjacent to the Cocheco River near the Cocheco Falls dam. It has several benches and a walkway that provide a viewing area for the New Hampshire Fish & Game fish ladder and the dam.

Maglaras Park - 29 acres - Community Park

Situated near Henry Law Park, Maglaras Park has frontage on Henry Law Avenue and the Cocheco River. It presently contains two minor league baseball fields and a multi-use playing field. The privately owned South Side Little League Field is directly adjacent to this park. Maglaras Park has the potential to be one of Dover's outstanding recreational facilities for organized sporting events.

Cocheco Riverwalk - Community Park

The newly revitalized Cocheco River Walk is a cornerstone and central attraction to the downtown. The River Walk contains a footbridge, a canoe launch and picnic areas which have been created since the 1988 Master

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Plan. The city's sewage treatment plant has been removed from this area and relocation of the Public Works facility from River Street is under discussion. The relocation of these facilities will provide an opportunity to extend the greenbelt created by the Cocheco River Walk to Maglaras Park.

Miscellaneous

Access Guide to the Cocheco River (2003) by the Cocheco River Watershed Coalition and Strafford County UNH Cooperative Extension. Information from this guide was used to develop a public outreach guide as part of "Step Up....To a Healthy Heart!", a community program to improve fitness levels. The program is sponsored by the Healthy Heart Task Force. The guide "*Expanded Walking Guide of Strafford County*" featuring Dover, Durham, Middleton, New Durham and Rochester, includes descriptions and maps of trails and other recreational opportunities along the Cocheco River.

The regional cable company, Metrocast, produced a series of videos for the annual Cocheco River Paddle event from about 2002-2007. These videos are shown annually on public access Channel 12.

(d) Public Access

List any existing public access sites located along the river. These may be formal or non-formal access points. Include the type of public access (e.g., canoe only), related facilities (e.g., parking), and if known, ownership at each site.

Table 30. Public Access to the Cocheco River

Community	Waterbody	Location	Type of Access	Related Facilities	Ownership
Dover	Cocheco River	Strafford County Farm	Trails, Scenic Vistas	None	Dover
	Cocheco Riverwalk	Downtown Locations	Trails, Walkways, Picnic Areas	None	Dover
	Cocheco River	Fish Ladder Park	Walkway, Benches	None	Dover
Farmington	Cocheco River	Watson Corner Rd	Canoe/Kayak Launch	None	Public Right of Way
	Cocheco River	Farmington Town Forest	Trails	None	Farmington
Rochester	Cocheco River	Little Falls Bridge Rd	Canoe/Kayak Launch	None	Public Right of Way
	Cocheco River	Hanson Pines Park – Dewey St	Trails, Picnic Areas, Canoe/Kayak Launch	None	Rochester
	Axe Handle Brook		Park, Picnic Area	None	Rochester
Gonic	Cocheco River	Ironwood Park	Canoe/Kayak Launch	None	Gonic
	Cocheco River	Pickering Ponds	Trails, Benches	None	Gonic

[Source: Access Guide to the Cocheco River (2003) by the Strafford County UNH Cooperative Extension and the Cocheco River Watershed Coalition]

Bridge Purchase

In 2004, the Dover City Council authorized the purchase of a former railroad bridge off Washington Street along with the surrounding tracks to make it a part of a future community trail to link a city-wide walking/bike path utilizing the abandoned B&M rail tracks which runs along the Cocheco River. [Source: Dover Community News-The Voice of the Community, Cocheco Cleanup Continues; Bridge Purchased For Trail" by Rebekah Brooks]

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5. Other Resources

(a) Scenic Resources

Briefly describe any significant scenic focal points along the river including designated viewing areas and scenic vistas and overlooks. Indicate the location of the significant views to and from the river.

New Durham

The main stem of the Cocheco River descends from headwater wetlands as a small forested stream. The New Durham-Middleton Road crossing is the first place for public viewing. Along that road are viewpoints looking across the Cocheco Valley to the Blue Hills headwaters.

Farmington

At the Old Bay Road crossing just above the breached Waldron Dam the river drains an extensive wetland, which in season is a riot of colorful wildflowers. At the Cocheco Road crossing by the Farmington dump road one can canoe downstream to downtown Rochester through the quiet river corridor. Songbirds, shorebirds, ducks, deer, beaver, turtles, fish and banks of wildflowers can be seen from the canoe.

Rochester

From Little Falls Bridge to the North Main Street Bridge, a surprisingly green river corridor slips right into the urban center of Rochester. On the east bank, Hanson Pines Park with its large stand of white pines is a haven within the city. The arched bridge at North Main Street is a focal point in the urban downtown. The City Dam and Hatfield Dam just downstream at Wyandotte Falls are popular viewing points. Just downstream of the Wyandotte Mill RHA Housing is a little known view down around a bend in the river and up at a white church steeple, one block from the center of urban downtown Rochester. The corridor from the Rochester Fairgrounds to Route 125 provides scenic canoeing. Snow's Intervale by the Allen School is a city-owned park in the forested floodplain with quiet paths for walking. Pickering Ponds are functional wetlands that once were aeration ponds for the WWTF. Trails around the levees that parallel the river offer views for birding as well as good walking.

Dover

Trails at the Strafford County Farm provide views of the old covered bridge abutments and the river corridor as well as adjacent fields and a wildlife reserve. At the end of Upper Factory Road there are views of the old breached dam and river rapids. In downtown Dover the Riverwalk offers several viewpoints of the river and historic mills.

(b) Land Use

Briefly describe the general patterns of current land use in the river corridor. Include location of significant developments within the river corridor including agricultural, residential, commercial, and industrial developments, and solid waste management facilities. Also include location of lands used for forest management or which are undeveloped. Identify such features as roads along the river, railroads, bridges, and utility crossings. Describe the type and location of any proposals for major developments within the river corridor.

The following statistics on the Cocheco River help to illustrate the importance of the river to the region and the impacts that the human population has and may continue to have on the river and its watershed.

Table 31. Population Facts and Figures for the Cocheco River Watershed

Population of Watershed – 2000	68,689
Projected Population – 2020	83,370
Population Change from 2000 to 2020	14,681 (21.4%)
Change in Impervious Surface Area from 1999 to 2000	5.9%

[Source: from Cocheco River Watershed Environmental Quality Report (February 2005), D.B. Truslow Associates]

Refer to Figure 8. Existing Land Use for additional information.

Following is a general description of the land characteristics of the five subwatersheds that comprise the greater Cocheco River Watershed.

Table 32. Land Characteristics of the Cocheco River Watershed (refer to Figure 2 for map of the subwatersheds listed in the table below)

Subwatershed	Towns/Cities in Subwatershed	Area (square miles)	Land Characteristics
Upper Cocheco	New Durham, Middleton, Milton, Farmington	43.2	Largely rural and lightly developed in upper portions. Development density around upper lakes and ponds increasing. Densely settled village area of Farmington and commercial zone on Route 11 in the lower portion of the subwatershed.
Middle Cocheco	Farmington, Rochester	24.9	Sand and gravel industries, Farmington waste water treatment plant, and landfills in upper portion. Lightly developed in middle portion. Lower portion heavily developed around urbanized areas of Rochester. Rapid suburbanization is decreasing the area of open lands in middle and lower portions of subwatershed. A large wetland complex, Heath Bog, occurs in this area.
Axe Handle Brook	Farmington, Rochester	11.6	Rural to light suburban development overall. Lower portion more heavily developed. Commercial/residential area near confluence of the brook with the main stem of the river. Rochester Reservoir in this area.
Lower Isinglass	Rochester	22.8	Area around Gonic Village heavily settled, and includes Rochester wastewater treatment plant. Balance of area lightly settled, some agricultural lands, but

			becoming more suburbanized. Turnkey Landfill located near border with Middle Cocheco subwatershed at Rochester Neck.
Lower Cocheco	Rochester, Dover, Somersworth	25.3	Lightly developed or suburbanized in upper watershed. Rapid growth in formerly rural areas. Densely settled and urbanized in lower subwatershed in Dover City Central. Large wetland complex at the Hoppers and along the Blackwater Brook. Important wetlands also surround Gonic Hill near the northern subwatershed boundary.

[Source: Watershed Restoration and Implementation Plan for the Cocheco River, June 2006]

Table 33. Bridges of the Cocheco River Corridor

Community	Total	Private-Local	State Highway
Dover	11	7	4
Rochester	16	8	8
Farmington	9	4	5
New Durham			
Total			

[Source: NH Department of Transportation]

(c) Land Use Controls

Identify the municipalities with existing master plans and zoning ordinances within the river corridor. Identify existing or significant proposed land use controls which affect the river and the river corridor (e.g., zoning, easements, subdivision regulations).

Following is a listing of **local zoning requirements and overlay districts** adopted in each corridor community that apply to the Cocheco River, and its corridor and watershed.

Town of New Durham

Water Quality Protection District

The surface waters (streams, rivers, lakes and ponds) and wetlands of New Durham supply drinking water, wildlife habitat, and recreation opportunities for the community. In order to preserve these critically important resources New Durham shall require conservation and land management practices which minimize environmental degradation and alteration of scenic and rural character. The purposes of the Water Quality Protection Ordinance are: to protect public and private water supplies, to trap sediment and other pollutants in surface and subsurface runoff, to promote bank stabilization, to protect riparian wetlands, to minimize the impact of floods, to prevent decreases in base flow, to protect wildlife habitat, and to generally maintain water quality. The Water Quality Protection Ordinance ensures areas of restricted development and limited land use adjacent to surface waters and wetlands in New Durham.

Shorefront Conservation Area

Most of the land immediately adjacent to New Hampshire's lakes, ponds and rivers is overlaid by soil types characterized by above average erosion and drainage hazards. These lands require conservation and land management practices which minimize environment and aesthetic degradation. Restrictions are designed to protect and enhance water quality, prevent overcrowding of the shore land in the interest of public health and safety, and to preserve the natural beauty and wildlife habitat of the water front areas.

Wetland Protection District

Restricts construction in environmentally sensitive wetland areas and disallows very poorly drained soils from being considered toward meeting the requirements of minimum lot sizes in new subdivisions.

Steep Slope Protection District

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Submitted May 29, 2008

Addenda July 23; August 19; October 1, 2008

The purpose of this ordinance is to regulate the use of steeply sloping lands in order to limit soil loss, erosion, excessive storm water runoff, and the degradation of surface waters, and to maintain the natural topography and drainage patterns of land. Prohibits most disturbances of slopes greater than 30%, and requires Best Management Practices and a Conditional Use Permit for most new development on slopes greater than 15%.

Conservation Focus Area District

The purpose is to: maintain diverse wildlife habitat, abundant wetlands, high water quality, productive forests, and outstanding recreational opportunities; conserve the best remaining lands of exceptional significance containing the critical ecological, biological, and water resources of New Hampshire's coastal watershed; and guide the location, density and design of development within the conservation focus areas to minimize harmful impacts while allowing for a reasonable level of use of these lands.

Town of Farmington

Sensitive Area Development Standards

Provides guidelines for the environmental protection of areas with steep slopes. The intent is to prevent erosion and/or flooding caused by human activity. No site disturbance shall be allowed on slopes exceeding twenty-five (25%), except for logging and construction of a driveway access for a single lot in a subdivision.

Aquifer Protection Overlay District

In the interest of public health, safety and general welfare, and in order to protect, preserve and maintain existing and potential ground water supply and ground water recharge areas within the known Aquifer from adverse development or land use practice. The Aquifer Protection Zone shall be those areas delineated by the New Hampshire Department of Environmental Services as Wellhead Protection Areas designated for the protection of drinking water resources. Specific high risk and high hazard uses are prohibited, and non-conforming uses may not be expanded, changed to another non-conforming use or renewed after it has been discontinued for a period of twelve months or more.

Watershed Protection Overlay District

The Watershed Protection Overlay District shall apply to all land within the municipal boundaries of the Town of Farmington and any use of land or development activity within the **Cocheco River Watershed** that is subject to Site Plan Review by the Planning Board, shall conform to the following standards: Not more than thirty-five percent (35%) of the total vegetated area of a Lot may be covered by impervious surfaces, including buildings, Structures, and paved or gravel surfaces unless the owner of the parcel demonstrates that such development will be carried out in accordance with Best Management Practices; Vegetated buffer strips at least twenty-five (25) feet wide shall be maintained adjacent to waterways, drainage ditches and swales; and the Planning Board may require an analysis of nutrient export levels and incorporate nutrient loading control devices

Wetlands Conservation Overlay District

Established to regulate the uses of lands subject to standing water, flooding or high water tables for extended periods of time, and to prevent: the development of structures and land uses on naturally which will contribute to pollution of surface and groundwater by sewage, sediment and/or noxious substances; destruction of, or significant changes to natural wetlands which provide flood protection; protect rare, unique and unusual natural communities and species, both flora and fauna; protect wildlife habitats and maintain ecological balances; protect existing and potential water supplies and aquifers (water bearing strata) and aquifer recharge areas; prevent the expenditure of municipal funds for the purposes of providing and/or maintaining Essential Services and utilities which might be required as a result of misuse or abuse of wetlands; and protect the wetlands, watercourses, water bodies of the Town from degradation and help maintain their natural functions and beauty.

Waterfront Protection Overlay District

The Waterfront Protection Overlay District shall consist of two separate and distinct zones of enforced restrictions: 1) Controlled Development Zone comprises all areas that lie within two hundred fifty (250) feet of any water body requiring that all development activity that disturbs the natural surface of the land, be conducted with proper erosion control methods that will eliminate unnatural sediments and water velocities from entering a water body; and 2) Limited Development Zone comprises all areas that lie within one hundred (100) feet of any water body and within the Urban Residential District shall comprise all areas that lie within fifty (50) feet of a water body; and where permitted uses include forestry,

agriculture, wildlife refuges, parks and recreation, nature trails, open spaces and wells. All other uses require a Special Use Permit from the Planning Board.

City of Rochester

Article 42.15. Permitted Uses

Setback for solid waste facilities shall be 100 feet from the 100-year flood plain of the Cocheco and Isinglass Rivers or 200 feet from the thread of such rivers, whichever is greater.

Article 42.19 Conservation Overlay District includes rivers, lakes, ponds, perennial streams, vernal pools, all jurisdictional wetlands and the surrounding upland areas of each of these resources to protect native wildlife habitat and natural vegetation upon which a variety of upland and aquatic species are dependent for purposes of breeding or sustenance.

Article 42.21. Aquifer Protection District

Coverage of more than forty percent (40%) of any lot with impervious surfaces is not allowed, except that the Planning Board may allow up to sixty percent (60%) coverage of any lot with impervious surfaces if engineering design provides adequate purification and recharge conditions.

City of Dover

170-27. Conservation District.

A. Purpose. In the interest of environmental quality, public health, resource conservation and the general welfare of the public, the regulations of this district are designed to guide development activities in areas with extended periods of high water table, with susceptibility to flooding and with unique or fragile geologic, ecological or nature features in those areas within a minimum of one hundred (100) feet of the mean high water of any water body, river, stream, swamp or marsh subject to tidal action and those areas within a minimum of one hundred (100) feet of the mean high water of any freshwater river or natural pond.

170-28.3. Groundwater Protection

A. Purpose. The purpose of this ordinance is to promote the public health, safety and general welfare by protecting and preserving the quality of existing and future groundwater supplies from adverse or detrimental land use, development or activities. The ordinance prohibits specific high risk activities and use of hazardous substances; requires a stormwater management plan for development where post-development infiltration volumes shall be no greater than predevelopment volumes and stormwater shall be treated by use of a stormwater treatment system designed to remove no less than eighty percent (80%) of the annual load of total suspended solids.

170-29.7. Operational Standards (Article VIII. Extraction Industries)

No excavation shall be permitted within 100 feet of any great pond, navigable river, or any other standing body of water 10 acres or more in area, or within 50 feet of any other stream, river or brook which normally flows throughout the year, or any naturally-occurring standing body of water less than 10 acres, prime wetland as designated in accordance with RSA 482-A: 15, I or any other wetland area as defined by the Department of Environmental Services (DES) and the City of Dover Code.

Subdivision Regulations

155-22. General Requirements.

E. No structures or septic systems will be allowed to be built in the following areas: areas with a slope greater than twenty (20) percent; areas within conservation districts; all flood hazard areas, unless flood proofing standards can be met through construction practices, and; undevelopable wetlands as defined in Dover's Zoning Ordinance.

Table 34. Zoning Districts for Communities in the Cocheco River Corridor

Community	Zoning District	Acreage
Dover	General Residential	6
	Central Business	90
	Cocheco Waterfront District	19
	Executive/Technology Park	264
	High Density Multi-Residential	117
	Low Density Residential	101
	Medium Density Residential	254
	Medium Density Multi-Residential	61
	Office	2
	Rural	1,164
	Urban Density Multi-Residential	14
	Urban Multiple Use	12
Rochester	Agricultural	1,610
	Business 1 and 2	313
	Industry 1-4	925
	Residence 1 and 2	887
	Agricultural Residential	24
	Commercial Center	133
Farmington	Industrial Business	106
	Office Research Business	242
	Rural Residential	1,126
	Suburban Residential	575
	Urban Residential	193
	Village Center	24
	Water	26
	Residential Agricultural	1,610
New Durham	Residential-Agricultural	994
Middleton	Rural Residential	217
Milton	Low Density Residential	18
Total		9,518

[Source: SRPC 2007 Zoning and Land Use Database]

Following is a summary of the local zoning requirements and regulations relating to building setbacks, use setbacks, and riparian buffers that apply to the Cocheco River.

Table 35. Local Zoning Requirements and Regulations for the Cocheco River [Source: Dover, Farmington, New Durham and Rochester Zoning Ordinances]

ZONING ORDINANCE	DOVER	FARMINGTON	NEW DURHAM	ROCHESTER
Building Setback	75-feet	100-feet	75-feet ¹ 75-feet ² 100-feet	75-feet
Septic Setback	75-feet	100-feet	125-feet	75-feet
Stream/River Buffer			100 feet ³	
Wetland Setback/Buffer	50-feet	50-100 feet	75-feet	50-feet
Impermeable Setback			75-feet	
Lot Coverage %			15% building 20% impervious area	
Excavation Setback	50-feet	Prohibited in Aquifer Protection Zone		
Solid Waste Facility		Prohibited in Aquifer Protection Zone		100 feet from 100 year flood plain of the river or 200 feet from the thread of the river, whichever is greater
Waterfront Protection Overlay District		Waterfront Protection Overlay District		Conservation Overlay District
Open Space		Optional	PB discretion	
REGULATIONS	DOVER	FARMINGTON	NEW DURHAM	ROCHESTER
Building Setback	N/A	N/A	75-Setback (Building Regulation) ³	N/A
Buffer Setback	N/A	N/A	Required Dedication ⁴	N/A

¹ ND ZO Art XII Sect F 2 (b): Non-conforming setback –50-feet

² ND ZO Art V Sect K 4: Riparian buffer zone reference in Deeds

³ ND ZO Conservation Focus Area District. Buffers required for all perennial streams in the Cocheco Headwaters Core Focus Area

³ NH ZO Art XII Sect F 2 (b): Non-conforming setback –50-feet

⁴ Site Plan Reg Sect IX C-2(b): The applicant shall dedicate, whether in fee or by drainage or conservation easement, land on both sides of existing watercourses to a distance to be determined by the PB.

(d) Water Quantity

List the location of all operating stream gauge stations maintained by the U.S. Geological Survey, U.S. Army Corps of Engineers or the Department of Environmental Services. Include the number of years of record and whether it is a partial or full record station.

USGS Gage Station #01072800 Cocheco River Near Rochester, Strafford County, NH

Latitude 43°16'06", Longitude 70°58'27" NAD27; Gage Datum: 119.38 feet above sea level NGVD29

Hydrologic Unit: 01060003, Drainage Area: 85.7 square miles

Data from 1995 through present; Full Record Station

The USGS estimates that there are 85.7 square miles of drainage basin upstream from this discharge monitoring station. The Rochester gage has been collecting dialing discharge measurements since March 1, 1995. Discharge data from March 1995 to the present and station gage information is available at the USGS National Water Information System Web Interface at <http://waterdata.usgs.gov/nwis/inventory>.

(e) Riparian Interests/Flowage Rights

Flowage rights and mill privileges were associated with many of the historic dams and water withdrawals from the mills. Some of these rights and privileges remain as remnants in the County records of the mill privileges. Refer to Section VII (3) Resource Assessment – Cultural Resources for descriptions of these historic dams and mill industries on the river.

REFERENCES

Bedrock Geologic Map of New Hampshire, USGS State Geologic Map, 1997, by J.B. Lyons, Bothner, W.A., Moench, R.H., and Thompson, J.B.; 2 sheets, scale 1:250,000 and 1:500,000.

Cocheco River Watershed: An Historical Perspective by Reuben Hall, Jr., P.E. for the Cocheco River Watershed Coalition (November 1997)

Cocheco River Watershed Environmental Quality Report (February 2005); Prepared by Thomas R. Fargo and Danna B. Truslow, D.B. Truslow Associates, Rye, NH; Prepared for Cocheco River Watershed Coalition, Dover, NH

The Economic Impact of Potential Decline in New Hampshire Water Quality: The Link Between Visitor Perceptions, Usage and Spending (May 2007); Prepared for The NH Lakes, Rivers, Streams and Ponds Partnership by Anne Nordstrom, PH.D.

Effects of Urbanization on Stream Quality at Selected Sites in the Seacoast Region in New Hampshire, 2001—03, USGS Scientific Investigations Report 2005-5103; Prepared in cooperation with the New Hampshire Department of Environmental Services.

Factors Related to Well Yield in the Fractured-Bedrock Aquifer of NH, USGS Professional Paper 1660, 2002, by Richard Bridge Moore, G.E. Schwarz, S.F. Clark, G.J. Walsh, and J.R. Degnan, 51 pg.

Geohydrologic, Ground-Water Quality, and Streamflow Data for the Stratified –Drift Aquifers in the Bellamy, Cocheco, and Salmon Falls River Basins, Southeastern New Hampshire. by Sean M. Lawlor and Thomas J. Mack USGS Open-File Report 89-583 – Well Yield Probability Study

Geohydrology and Water Quality of Stratified-draft Aquifers in the Bellamy, Cocheco, and Salmon Falls River Basins, Southeastern NH, USGS Water-Resources Investigations Report 90-4161, 1992, by Thomas J. Mack and Sean M. Lawlor, 65 pgs plus appendix

Hydrogeology of the Cocheco River Basin, Southeastern NH, USGS Water-Resources Investigations Report 87-4130, 1989, by John E. Cotton, 47 pg.

Hydrology of the Cocheco River Basin, Southeastern New Hampshire by John E. Cotton, USGS Water resources Investigation Report 87-413, 1989 Transmissivity study.

Managing and Restoring Native Ecosystems: A Guide for New Hampshire Towns, Draft#2 prepared by Alan P. Ammann Ph.D., Biologist (1999)

New Hampshire Nutrient Criteria Development: Relationships between Nutrient and Eutrophication Parameters in Three Riverine Impoundments. A final report to the US EPA Region I by Phil Trowbridge and Paul Piszczek, NHDES 2005

Watershed Restoration and Implementation Plan for the Cocheco River (June 2006); Prepared by Danna B. Truslow, D.B. Truslow Associates, Rye, NH; Prepared for Cocheco River Watershed Coalition, Dover, NH

APPENDIX A. MAP SET

- Figure 4. Natural River: Segment #1**
- Figure 5. Cocheco Watershed and Proposed River Segments**
- Figure 6. FEMA 100-year Flood Plain**
- Figure 7. Conservation Lands and Unfragmented Lands**
- Figure 8. Existing Land Use**
- Figure 9. Ground Water Hazards**
- Figure 10. Native Ecosystems**
- Figure 11. Soil Properties**
- Figure 12. Recreational and Historical Resources**
- Figure 13. Water Resources – Surface Waters, Aquifers and Wetlands**
- Figure 14. Land Conservation Plan for NH's Coastal Watersheds - Core Focus Areas**
- Figure 15. NH's Wildlife Action Plan - Core Focus Areas and Area**

APPENDIX B. COMMUNITY INVOLVEMENT - SUPPORTING MATERIALS

1. Informational Flyer distributed at the 2008 Cocheco River Clean-Up event
2. Foster's Daily Democrat Article from May 4, 2008
3. Rochester Times Article from May 8, 2008
4. Rochester Times Article from May 15, 2008
5. Rochester Times Article from May 22, 2008
6. Proclamation from the Commissioners of Strafford County to Ron Chagnon and Don Black
6. Cocheco River Watershed Coalition 2008 Annual Meeting of March 27, 2008
7. Letter of April 25, 2008 from Cocheco River Watershed Coalition to Rochester City Council (also distributed to City staff)
8. Cocheco River Watershed Coalition and University of New Hampshire Cooperative Extension 2008 Cocheco River Sweep Flyer (distributed to 250 persons)
9. Letter of April 28, 2008 from Cocheco River Watershed Coalition and University of New Hampshire Cooperative Extension to Strafford County Delegation, Senators and County Commission regarding the 2008 Cocheco River Sweep
10. Copies of Notification of Corridor Communities letters and receipts mailed on May 23, 2008 to the Towns of New Durham, Middleton, Milton and Farmington, and the Cities of Rochester and Dover
11. Letter of Support from Strafford Conservation Commission dated May 29, 2008

ADDENDUM 1. SUPPLEMENTAL INFORMATION

Items submitted to NHDES at the July 23, 2008 Public Hearing

12. 2006 Cocheco Water Use Report
13. City of Rochester Water Works – Documentation of Flowage Rights
14. Revised Map: Figure 5- Watershed and Proposed River Segments
15. Great Bay Estuary Restoration Compendium (The Nature Conservancy, September 2006): Figures 9-15 Historic and Current Distribution of Fish Species in the Coastal Watershed; Pages 35-40 Diadromous Fish in the Coastal Watershed
16. New Hampshire Estuaries Project: Environmental Indicator Report: Critical Habitats and Species (March 2006): Pages 26-33 HAB8 – Anadromous Fish Returns

ADDENDUM 2. SUPPLEMENTAL INFORMATION

Items submitted to NHDES or received by August 19, 2008

17. 2nd Addendum August 19, 2008 documented changes (incorporated into nomination document)
18. Attendance List from Public Hearing on the Nomination held July 23, 2008
19. Letter of Completeness from Rivers Coordinator dated June 5, 2008
20. Rochester Times article July 31, 2008
21. Fosters articles dated August 5, 2008 and August 7, 2008
22. Dover Conservation Commission Letter of Support dated July 23, 2008
23. New Durham Planning Board Letter of Support dated July 23, 2008
24. NH Estuaries Project Letter of Support dated August 7, 2008
25. Rochester City Council Letter of Opposition dated August 12, 2008

ADDENDUM 3. SUPPLEMENTAL INFORMATION

Items received or submitted by October 1, 2008

26. Spreadsheet of Testimony at Public Hearing and Comments received by August 22, 2008
27. Southern NH Hydroelectric (John Webster) Comments dated August 22, 2008
28. Rochester Conservation Commission Letter of Support dated August 21, 2008
29. Rochester Riverwalk Committee Letter of Support dated August 20, 2008
30. Middleton Board of Selectmen Letter of Support dated May 22, 2008
31. Lorie Chase Memorandum of Response to John Webster's comments dated September 1, 2008
32. NH Rivers Management Advisory Committee Recommendation Letter dated September 12, 2008
33. NH Rivers Coordinator Recommendation Letter dated September 22, 2008
34. NH Department of Environmental Services Commissioner Recommendation Letters dated September 30, 2008

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Submitted May 29, 2008

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